

WATER AND SOIL RESOURCES

Testimony of
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INTRODUCTION

This section analyzes potential effects on soil and water resources that would be caused by the East Altamont Energy Center (EAEC), as proposed by East Altamont Energy Company, LLC, a subsidiary of Calpine Corporation (Calpine or Applicant). The analysis specifically focuses on the potential for the project to cause impacts in the following areas:

Whether construction or operation would lead to accelerated wind or water erosion and sedimentation.

Whether the project would exacerbate flood conditions in the vicinity of the project.

Whether the project's demand for water would adversely affect surface or groundwater supplies.

Whether project construction or operation would lead to degradation of surface or groundwater quality.

Whether the project would comply with all applicable laws, ordinances, regulations and standards.

Where the potential for impacts is identified, staff has proposed mitigation measures to reduce the significance of the impact and, as appropriate, has recommended conditions of certification.

Solid waste disposal is also discussed in the **Waste Management** section, as are land use effects in the **Land Use** section of this Staff Assessment.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

FEDERAL

Clean Water Act (CWA)

The Clean Water Act (33 U.S.C. Section 1251 et seq.) was enacted with the intent of restoring and maintaining the chemical, physical, and biological integrity of the waters of the United States. The CWA requires states to set standards to protect, maintain, and restore water quality through the regulation of point source and certain non-point source discharges to surface water. Those discharges are regulated by the National Pollutant Discharge Elimination System (NPDES). In California, NPDES permitting authority is delegated to, and administered by, the nine Regional Water Quality Control Boards (RWQCB).

Section 401 of the Clean Water Act requires that any activity that may result in a discharge into a water body must be certified by the RWQCB. This would apply to

stream crossings during pipeline construction. This certification ensures that the proposed activity will not violate state and federal water quality standards.

Section 404 of the Clean Water Act authorizes the U.S. Army Corps of Engineers (ACOE) to regulate the discharge of dredged or fill material within the waters of the U.S. and adjacent wetlands. The ACOE issues individual site-specific or general (nationwide) permits for such discharges.

Encroachment Permit from USBR and the San Luis Delta-Mendota Water Authority

In order to accommodate directional drilling for routing the fresh water supply pipeline under the Delta-Mendota Canal, the Applicant will need to obtain an Encroachment Permit from the United States Bureau of Reclamation (USBR) and Delta-Mendota Water Authority. The USBR manages the Delta-Mendota Canal as a component of the Central Valley Project (CVP), and is responsible to review and approve plans that could potentially impact the integrity of the canal.

STATE

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act of 1967, Water Code Section 13000 et seq., requires the State Water Resources Control Board (SWRCB) and the nine RWQCBs to adopt water quality criteria to protect state waters. Those criteria include the identification of beneficial uses, narrative and numerical water quality standards and implementation procedures. Water quality criteria for the project area are contained in the Water Quality Control Plan for the Central Valley Region. This plan sets numerical and/or narrative water quality standards controlling the discharge of wastes to the state's waters and land. Those standards are applied to the proposed project through the Waste Discharge Requirements (WDRs) permit issued by the RWQCB.

Water Supply Permit

Under Title 22 of the California Code of Regulations, the California Department of Health Services reviews and approves any surface water treatment systems that serve the domestic water needs of more than 25 people daily, 60 days out of the year. This program is administered through the Drinking Water Program.

LOCAL

County of Alameda

The EAEC and portions of the proposed water and recycled water lines are located in Alameda County. The Energy Commission will require a Grading and Excavation Permit consistent with the requirements of Alameda County Public Works Agency.

County of Contra Costa

Proposed fresh water lines on the northern portion of Bruns Road and Byron Bethany Road are located in Contra Costa County. The Energy Commission will require a Grading and Excavation Permit consistent with the requirements of Contra Costa County Public Works Department.

County of San Joaquin

Proposed recycled water lines on the east end of Kelso Road are located in San Joaquin County. The Energy Commission will require a Grading and Excavation Permit consistent with the requirements of San Joaquin County Community Development Department.

ENVIRONMENTAL SETTING

PROJECT DESCRIPTION

Calpine proposes to build the EAEC, a 820 MW combined cycle plant augmented by 245 MW of duct firing, in Alameda County. The Applicant proposes to construct EAEC within 40 acres of a 174-acre parcel being acquired by Calpine. An additional 29 acres will be required for a temporary construction laydown area. For operation of the EAEC several new linear facilities will be required. Please refer to **Project Description** section of this document for a complete description and diagrams of the proposed project and these ancillary facilities.

As proposed, EAEC's total annual water demands are projected to be 4,616 acre-feet/year (afy) on an average annual basis (4.0 million gallons a day [mgd] average daily flow), and up to 7,000 afy on a peak annual basis (9.1 mgd peak daily flow). Average daily water requirements of 4.0 mgd are based on the plant operating at 820 MW at an ambient temperature of 61°F without duct firing or steam injection. Peak daily water requirements of 9.1 mgd are based on the plant operating at 1,065 MW at an ambient temperature of 98°F with maximum duct firing and steam injection.

Water use for the proposed EAEC is divided into four main levels based on the quality required: 1) water for the circulating or cooling water system; 2) service water for the plant, which includes all other miscellaneous uses; 3) demineralized water for makeup to the Heat Recovery Steam Generators (HRSG's) and auxiliary boilers; and 4) potable water for drinking and lavatory use. Cooling water (representing 99 percent of the project's overall water demand during normal operations) will be raw fresh water or recycled water (tertiary treated) as-is without further treatment. Service water for the plant, including fire water, will be obtained from the cooling tower blowdown stream after filtration and water softening. A dedicated fire water supply will be contained in the reverse osmosis feed water storage tank sufficient for a 2-hour worse-case fire (EAEC, data request and response, Set #3, Oct. 9, 2001, Response #132). Demineralized water for makeup to the HRSG's and auxiliary boilers will be obtained from treatment of the cooling tower blowdown reject stream, utilizing distillate from the brine concentrator with additional polishing from the mixed bed demineralizer.

Domestic potable water will be generated on-site from raw water delivered by BBID using a package treatment plant unit (US Filter Water Boy pre-engineered package plant with microfiltration and UV disinfection or equivalent) (EAEC 2001g, p. 2).

Soils & Water Table 1 summarizes the use of water for EAEC operations, and the discharge of wastewater associated with the proposed EAEC.

Soils & Water Table 1
EAEC Facility Water Balance

Component Stream	Average Day (gpm)	Peak Day (gpm)
Turbine Injection Water	0	122 (See Note 3)
Cooling Tower Makeup	3,264	6,822
Brine Concentration Distillate fed to HRSG's/ Steam Cycle	50 (See Note 3)	647
Reuse in Cooling Tower of Liquid Waste Streams	- 451	- 1,058
Demin. Water from Storage	0	218 (See Note 3)
HRSG Stack	0	776 (See Note 3)
Total Water Consumption (Net)	2,813	6,411
Blowdown HRSG's	Recycled To Cooling Tower	Recycled To Cooling Tower
Blowdown Cooling Tower	Recycled to Cooling Tower	Recycled to Cooling Tower
Plant Drainage	Recycled to Cooling Tower	Recycled to Cooling Tower
Brine Concentrator	Recycled to Cooling Tower & HRSG's	Recycled to Cooling Tower & HRSG's
Sanitary Wastewater	To Leach Field	To Leach Field
Total Wastewater (Net)	0	0

Notes:

1. Blowdown from the cooling tower assumes 7 cycles of concentration.
2. Flow rates reflect conditions using 100% fresh water.
3. Denotes quantity already accounted for in other Component Streams of the water balance;

Source: (EAEC 2001a, AFC Section 8.14)

Cooling process

Cooling water (99 percent of the project's water demand) is needed to dissipate waste heat from the generating process. The plant cooling system consists of a deaerating steam surface condenser, cooling tower, and circulating water system (EAEC 2001a, AFC Section 2). The heat rejection system will receive exhaust steam from the low-pressure steam turbine and condense it to water for reuse. The surface condenser will be a shell-and-tube heat exchanger with the steam condensing on the shell side and the cooling water flowing in one or more passes inside the tubes. The condenser will be designed to operate at sub-atmospheric pressure, ranging from 1.0 to 5.0 inches of mercury (Hg) depending on ambient temperature and plant load. Approximately 267,300 gpm of circulating water is required to condense the steam at maximum plant load.

The cooling water will circulate through a counter-flow mechanical draft-cooling tower. The water will pass over the condenser by gravity as air is drawn upward by the use of electric-motor-driven fans to move the air in a direction opposite to the flow of the water. The cooling tower is comprised of 19 cells or fan bays. The cooling system must be replenished with "make-up water" to replace water lost to evaporation, drift, and blowdown. The cooling system takes advantage of evaporation to remove heat, but cooling system water is "lost" through the evaporation. As the water flows downward a fine mist of water droplets is entrained in the warm air leaving the tower. This mist is termed "drift" and will be limited to 0.0005% of the circulating water flow by the use of drift eliminators. Evaporative losses cause the concentration of impurities in the recirculating water. Blowdown is the bleeding off of a small percentage of the total flow, so that the new make-up water balances the impurities to stay within system

specifications. Blowdown volumes are dependent on the quality of the make-up water and the system specifications regarding the impurities that are in the make-up water. Cooling water supplies will be supplemented with HRSG blowdown and Reverse Osmosis (RO) permeate following treatment of the cooling tower blowdown. During periods when the ambient air temperature is cool and the relative humidity increases, there will be a visible vapor plume that will emanate from the cooling tower.

Wastewater

Originally, Calpine proposed to discharge 77,000 gpd of concentrated wastewater (brine) to two onsite 15-acre evaporation ponds. A smaller wastewater recycling pond was also proposed (EAEC 2001a, Section 8.14). This proposal was changed in Supplement B of the Application for Certification (AFC), filed October 9, 2001. Supplement B eliminated the ponds and proposed instead the use of a zero liquid discharge (ZLD) system that uses a brine concentrator and two brine crystallizers or drum-type dryers to eliminate any liquid wastes. Treated water streams throughout the process are reclaimed for various plant uses. This wastewater treatment process will result in a solid waste consisting of a salt cake, which is hauled off-site for proper disposal at an appropriately licensed landfill.

A simplified description of the system starts with cooling water blowdown that is passed through a filtration system to remove suspended solids. Filtered cooling tower blowdown will next pass through an ion exchange softening process to remove calcium and magnesium. Waste from the ion exchange softeners will be sent to an equalization tank from which it will be metered slowly to the brine concentrators. Two 50-percent brine concentrators will be used to further concentrate the reject stream, before passing through crystallizers or dryers, where the majority of remaining water will be evaporated leaving a relatively dry salt cake suitable for landfill disposal (EAEC 2001y, Supplement B to the AFC). For a further discussion of the solid waste disposal issues, please refer to the **Waste Management** section of this document.

Sanitary wastewater will be discharged into a septic tank and leach field system, which will be established in a raised bed in order to maintain percolation above the shallow groundwater.

SITE AND VICINITY DESCRIPTION

Currently, the site is being used for grazing, and to farm oats, alfalfa, and hay crops, and occasionally row crops like tomatoes. The proposed site is located approximately 8 miles northwest of the City of Tracy, 12 miles east of Livermore, 5 miles south of Byron, and less than 1 mile from the Mountain House community, a new town starting Phase I construction. Characterized by relatively flat topography with rolling hills, the site is located east of the Altamont Pass more than 1-mile from the base of the Mount Diablo Range. An existing drainage channel runs along the eastern boundary of the site and discharges to the north of the EAEC site into the intake channel of the Delta-Mendota Canal (EAEC 2001a, AFC Section 8.4 & 8.15).

Land use in the vicinity of the EAEC is primarily agricultural situated around water supply, natural gas and power generation and transmission facilities of statewide importance. These facilities include the Western Area Power Administration (Western)

Substation, intake structures and pumping stations for the Central Valley Project's (CVP's) Delta-Mendota Canal and the State Water Project's (SWP's) California Aqueduct, PG&E's gas compressor station, numerous windfarms, and four 500-kV and nine 230-kV transmission lines. Several residences exist within one mile of the proposed EAEC site (EAEC 2001a, AFC Section 8.4).

SOILS

As stated above, the 174-acre site being acquired by the Applicant is currently in active agricultural production. All of the land is classified as prime farmland, as is most of the surrounding area. Within the 40-acre portion proposed for development, the EAEC site is gently sloped, naturally decreasing in elevation in a diagonal direction to the northeast. It ranges in elevation up to about 40 feet above mean sea level (msl) in the southwest corner to as low as 31 feet msl in the northeast corner.

As seen in **Soils & Water Table 2**, Rincon Clay Loam is the primary soil type covering the entire EAEC site. Soil types for the linear facilities tend to be similar to Rincon Clay Loam, primarily consisting of San Ysidro Loam for the raw water pipeline, Stomar Clay for the recycled water pipeline and Rincon Clay Loam for the natural gas pipeline, fiber optic cable, and transmission line. This well-drained soil is formed in alluvium from sandstone and shale on nearly level valleys and fans. Shrink-swell potential is moderate to high, which will require consideration in design and construction of equipment foundations.

Soils & Water Table 2
Soil Types Affected & Characteristics

Project Element	Primary Soil Name	Slope Class %	Depth Range	USDA Texture	Parent Material	Water Erosion Hazard	Permeability	Drainage	Revegetation Potential
EAEC Plant	Rincon Clay Loam (RdA)	0 – 3%	0 – 16 in.	Clay Loam	Alluvium from sedimentary rocks	Slight	Slow	Well Drained	Very Good
Water Line	San Ysidro Loam (Sc)	0 – 2%	0 – 15 in.	Loam	Alluvium from sedimentary rocks	Slight	Very Slow	Moderately Well Drained	Fair
Recycled Water Line	Stomar Clay Loam (252)	0 – 2%	0 – 17 in.	Clay Loam	Alluvium from sedimentary rocks	Slight	Slow	Well Drained	Good
Natural Gas Line	Rincon Clay Loam (RdB)	3 – 7%	0 – 16 in.	Clay Loam	Alluvium from sedimentary rocks	Slight	Slow	Well Drained	Very Good
Fiber Optic Line	Rincon Clay Loam (RdA)	0 – 3%	0 – 16 in.	Clay Loam	Alluvium from sedimentary rocks	Slight	Slow	Well Drained	Very Good
Transmission Line	Rincon Clay Loam (RdA)	0 – 3%	0 – 16 in.	Clay Loam	Alluvium from sedimentary rocks	Slight	Slow	Well Drained	Very Good

Although erosion potential from water is slight, the area is subject to moderate winds that could contribute to erosion of loose soils during grading and excavation activities of construction (EAEC 2001a, AFC Sections 8.4 and 8.9).

SOILS AND WATER CONTAMINATION

A Phase I Environmental Site Assessment (Phase I ESA) prepared for the EAEC site identified three recognized environmental conditions of potential concern associated with previous agricultural activities, all in the vicinity of an existing house and maintenance yard located on the southwest portion of the 174-acre parcel. They include the following:

1. Former location of the underground gasoline tank adjacent to the maintenance shed where there is no documentation of contamination to soil or groundwater, although the property owner recalls there may have been some leakage around the pipe fittings.
2. Pesticide container storage in the former chicken coop where 5-gallon containers of apparent pesticide and herbicide appear to be leaking and in poor condition;
3. Waste oil/fuel storage area, where two above ground tanks and buckets of waste oil are located and releases to the soil are visible.

During the September 6, 2001 Data Response Workshop in Livermore, the Applicant clarified that none of these recognized conditions were located in the vicinity where disturbance was planned for construction of the EAEC (EAEC 2001v, Attachment WR-1).

GROUNDWATER

The proposed EAEC site lies within the Mountain House alluvial fan, which is approximately 150 to 200 feet thick at the site. Shallow groundwater in the Mountain House area moves from the upper reaches of the alluvial fan towards surface water features in the low-lying Delta areas. Available groundwater information near the proposed project site indicates that shallow groundwater occurs at depths of 0 to 10 feet below grade. Groundwater movement is very slow, due to lack of irrigation pumping, permeability, and a high water table in the Delta. Vertical groundwater movement is impeded by a relatively thin water-bearing section of less than 200 feet above the poorly permeable and strongly confined deeper aquifers. Groundwater recharge in the area occurs from percolation of applied irrigation water and canal seepage losses. Because of the shallow groundwater, farmers frequently tile their fields to enhance drainage and protect crops from root damage. Another deep aquifer, the Kellogg Creek alluvial fan, is used for potable supply at the Discovery Bay and Brentwood communities, approximately 8 miles north of the site. Quality and yield in that area are good.

Groundwater of variable quality is typical in the area of the proposed project. Locally, shallower wells provide low-quality water to individual domestic users. Deeper wells provide water of higher quality to communities including Brentwood, Discovery Bay and Tracy, and to local irrigators. The available data characterizing groundwater quality is limited, but is described as follows:

**Soils & Water Table 3
Groundwater Quality**

CONSTITUENT GROUP	CONSTITUENT	UNITS	MEASURE
Cations	Calcium	mg/l	120
	Magnesium	mg/l	98
	Sodium	mg/l	760
	Potassium	mg/l	3.4
	Manganese	mg/l	10
Anions	Sulfate	mg/l	640
	Chloride	mg/l	980
	Fluoride	mg/l	0.3
	Nitrate	mg/l	14
Metals	Arsenic	µg/l	6
	Manganese	µg/l	10
Other	Hardness as Ca CO ₃	mg/l	700
	Conductivity	µmhos/cm	4570

Note: Data from well 01S/04E-33M01, sampled on 6-6-79 (Keeter, 1980).

As can be observed in **Soils & Water Table 3**, the overall quality of this groundwater sampled from an unknown depth, could be described as being particularly high in salinity and hardness. Although a concentration for Total Dissolved Solids (TDS) was not available, an estimated TDS concentration is on the order of 3,000 mg/l based on other constituent concentrations. As defined in the AFC and subsequent documents, the proposed project will not use groundwater for any of its water requirements.

SURFACE WATER HYDROLOGY

The climate in the project area is typical of the Central Sacramento Valley with hot, dry summers and mild winters. Daytime temperatures during the summer months range between 80°F and 100°F, with peak days up to 110°F. The rainy season generally extends from November through March. Average annual precipitation is about 12 inches. Average monthly precipitation is as shown in **Soils & Water Table 4**. Total elevation range on the 174-acre site is from 20 to 60 feet above mean sea level, while elevation on the 40-acre portion proposed for development of the EAEC ranges from about 30 to 40 feet. Currently, storm water runoff from the project site runs by sheet flow to the north, where it is collected in an east-west running drainage ditch, which in turn discharges into a north-south running drainage ditch that runs along the east side of the property. The north-south running drainage ditch drains to the north and discharges into the intake channel of the CVP's Delta-Mendota Canal.

**Soils & Water Table 4
Average Monthly Precipitation near the EAEC Site**

Precip.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(inches)	2.38	1.92	1.71	0.80	0.22	0.14	0.05	0.10	0.26	0.67	1.88	1.72

The proposed project site is located near the southwestern edge of the Sacramento-San Joaquin River Delta. The area is characterized by a series of natural and man-made stream channels, canals and drains that form a web of low-lying islands. The

foothills of the Coast Range are approximately 3 miles southwest of the site and generally define the southwestern edge of both groundwater and surface water resources. Surface water quality is characterized as high in the project vicinity, particularly in the southern Delta.

Because of its location near the confluence of the state's two major river systems, the area surrounding the project site has abundant surface water features. In addition to the natural river systems, the diversion facilities for both the CVP and SWP are located within several miles of the project site. The SWP draws its water from Clifton Court Forebay through the Skinner Fish Screen into the intake channel and is then pumped into the Aqueduct via the Harvey O. Banks Pumping Plant. From a separate point of diversion, the CVP also draws its water from Clifton Court Forebay through the Tracy Fish Screen into its intake channel and is then pumped into the Delta-Mendota Canal via the Tracy Pumping Plant. These aqueducts, supported by various storage reservoirs, convey nearly 6,000,000 acre-feet/year of municipal, industrial and agricultural water to the southern portion of California and play a significant role in the movement of water throughout the state. Because of its high quality and ready access, surface water is extensively used in the project area. An estimated 1,700,000 acre-feet/year of water from the Delta is diverted by local water users (EAEC 2001a, AFC Section 8.14).

EAEC Water Supply

To meet the water requirements of the EAEC, Calpine proposes to use a combination of fresh inland (raw) water supplied by BBID and, increasingly over time, tertiary treated recycled water from Mountain House Community Services District's (MHCSO) wastewater treatment plant.

Byron-Bethany Irrigation District (BBID)

BBID is a multi-county irrigation district established under Water Code Division 11 primarily to provide water to portions of lands in Alameda, Contra Costa and San Joaquin Counties near their junction. The distribution system is segregated into two divisions: the Byron Division (north of the SWP Intake Channel) and the Bethany Division (south of the SWP Intake Channel). BBID maintains two diversions within the SWP Intake Channel, located between the Skinner Fish Screen and Harvey Banks Pumping Plant, with one each dedicated for supplying the Bethany Division and the Byron Division. Open canals and pump stations makeup the primary distribution system, with some pipelines for supply to BBID customers. The original point of diversion was from Italian Slough, a tributary to Old River. BBID's point of diversion was changed to the intake channel of the California Aqueduct under agreement with DWR dated May 4, 1964 because development of the State Water Project (SWP) was going to displace the previous point of diversion. The AFC indicates BBID's normal maintenance schedule for their canals requires them to be shut down from November through March for cleaning of aquatic weeds and canal bank reshaping. To facilitate a more continuous operation of BBID's facilities, concrete canal lining and a water control structure will be used in the section of BBID's Canal 45 that is used for water supply to EAEC.

The water quality of BBID's fresh water supply varies according to season and hydrologic conditions in the Delta, and is characterized in the following ranges:

Soils & Water Table 5
BBID's Fresh Water Quality

CONSTITUENT	RANGE OF WATER QUALITY (MG/L)
Total Dissolved Solids	110 to 300
Alkalinity	40 to 95
Arsenic	0.001 to 0.003
Boron	<0.1 to 0.4
Bromide	0.04 to 0.21
Calcium	11 to 25
Total Organic Carbon	3 to 7
Chloride	18 to 67
Copper	<0.005 to 0.02
Hardness	48 to 118
Magnesium	2 to 14
Selenium	<0.001 to 0.001
Sodium	17 to 65
Sulfate	14 to 59

Note: Data based on monthly grab sample data collected from the SWP Intake Channel during 1995, 1996, and 1997 (through August). Data supplemented with grab sample data collected from SWP Intake Channel in July 1999 (EAEC 2001p, Recycled Water Feasibility Study).

Currently, BBID primarily supplies raw water to agricultural water users in its service area, with one current industrial user - Unimin Corporation - using water for aggregate mining and processing. The water put to beneficial use (as defined by the RWQCB) by BBID during 2000 was 31,711 acre-feet. The Applicant has represented that BBID, through conservation and recent reductions in agricultural customer diversions, has reduced its water use from historic highs, and that use by EAEC combined with use by BBID's other customers, would be within historic patterns of use (EAEC 2001a, AFC Sections 7.1.6 and 8.14.2). The Applicant has not provided any quantified data of BBID's historic water savings accomplished through conservation and or agricultural customer reduction measures.

BBID's historic diversions, from 1969 to 2000, are summarized as follows:

Soils & Water Table 6
BBID's Historic Annual Diversions, 1969 – 2000

YEAR	ANNUAL QUANTITY OF WATER DIVERTED (ACRE-FEET)
1969	32,404
1970	31,487
1971	39,222
1972	47,024
1973	38,437
1974	41,378
1975	41,408
1976	55,387
1977	52,517
1978	39,503
1979	43,897
1980	39,238
1981	40,390
1982	33,683
1983	24,023
1984	39,369
1985	32,405
1986	30,067
1987	35,438
1988	41,126
1989	37,355
1990	42,963
1991	37,214
1992	38,507
1993	33,175
1994	38,657
1995	25,060
1996	30,065
1997	35,368
1998	28,637
1999	33,003
2000	31,711

Note: Annual historic diversion data as supplied by BBID to DWR (CEC 2001i) & (EAEC 2002a, Data Request #135).

BBID's entitlement to fresh water is under a Pre-1914 Appropriative Water Right, established originally by its predecessor Byron-Bethany Irrigation Company, by filing a Notice of Appropriation of Water in Contra Costa County on May 18, 1914. Since the publication of Staff's preliminary assessment, BBID has negotiated with DWR an agreement to define under its right the amount it can divert without causing injury to the SWP (DWR, 2002a). Although BBID and the Applicant had claimed earlier in this proceeding that BBID was entitled to divert up to 60, 000 afy, the DWR/BBID agreement

caps this diversion amount at 50,000 afy at a rate not to exceed 300 cubic feet per second (cfs). As of this FSA publication, the DWR/BBID Agreement had been approved by BBID and was pending approval by DWR's management.

BBID's projected average annual fresh water demand is expected to exceed this limit of 50,000 afy within the life of the project (see **Soils & Water Table 10**). Not including the water demands of EAEC, BBID expects service area demand to be 48,541 afy in 2010, 50,615 afy in 2020 and 47,815 afy in 2030 (differences between demand in 2020 and demand in 2030 are due primarily to a reduction in agricultural use) (EAEC 2001a, Table 7-2, p. 7-3). Currently, BBID's only available resource to serve these demands is its surface water diversion. However, BBID has adopted the recommendations of its "Recycled Water Feasibility Study" to develop recycled water resources within its district for industrial development and a policy supporting the use of recycled water to meet future demands.

Recycled Water

To reduce the use of fresh water over time, the Applicant proposes to use tertiary treated (recycled) wastewater from the MHCSO wastewater treatment plant to meet a portion of its demand if it becomes available through BBID on terms and conditions acceptable to EAEC (BBID 2002e). As mentioned earlier, the Mountain House community is a residential development, currently under construction less than one mile from the proposed EAEC. Current construction of the community includes the first of twelve phases of residential development. A water treatment plant and a wastewater treatment plant are already completed. MHCSO will treat raw water it receives from BBID to potable quality before supplying it to its residents, and will treat its wastewater to Title 22 tertiary standards. Both the water treatment and wastewater treatment facilities are expected to begin providing services by December, 2002. Current RWQCB permits to MHCSO allow the tertiary treated effluent to be discharged to Old River and to farmland, with no restrictions to developing other uses for the recycled water supply.

Conservative growth projections have the Mountain House development fully built out by 2020. As the community develops, the MHCSO treatment facility will produce an increasing amount of recycled water, estimated at approximately 2,965 afy by 2010, 4,448 afy by 2015, and 5,930 afy by 2020 or earlier, with a peak daily rate of 5.4 mgd (see **Soils & Water Table 7**).

At BBID's regularly scheduled meeting of October 12, 2001, the Board of Directors adopted Resolution 2001-20 establishing a recycled water policy supporting the use of recycled water in the district under certain conditions, and establishing the district as the sole provider of such resources within its service area. In accordance with Public Utilities Code 1501 et seq., Water Recycling Act of 1991, Water Code 13575 et seq., the Water Recycling in Landscaping Act, and Government Code Section 65601, MHCSO must contract with BBID to distribute recycled water within BBID's service area. At this writing, no such contract or agreement has been reached between the two parties (MHCSO 2002b).

Originally the applicant expected that only a portion of the MHCSO tertiary treated water could be made available to the project. As provided in their feasibility study, Calpine projected total recycled water available for use by the EAEC as follows:

Soils & Water Table 7
Applicant's Projected Availability and Allocation
of MHCSO Recycled Water Supply (afy)

YEAR	2000	2005	2010	2015	2020	2025	2030	2035	2040
Total Recycled Water Produced	0	1,483	2,965	4,448	5,930	5,930	5,930	5,930	5,930
MHCSO's Estimated Use	0	983	1,155	1,953	3,046	3,046	3,046	3,046	3,046
Resulting Supply to EAEC	0	500	1,810	2,495	2,884	2,884	2,884	2,884	2,884

(EAEC 2001p, Recycled Water Feasibility Study)

According to the General Manager of MHCSO, all of the recycled water produced at the treatment facility can be made available to the EAEC, but actual amounts will be subject to the rate at which the community develops (MHCSO 2002b).

ANALYSIS OF PROJECT RELATED IMPACTS

DIRECT AND INDIRECT IMPACTS

Soils

The proposed project will result in both temporary and permanent land disturbance (grading, excavation, trenching, paving, etc). The power plant site and associated laydown area(s) will disturb nearly 80 acres of prime agricultural lands and permanently remove from production the 40 acres required for the plant facilities. Linear facilities consisting of the supply pipelines for water, recycled water and natural gas are generally proposed to run along roads or in previously developed utility right-of-ways in order to minimize new disturbance to prime farmlands. The new transmission lines will require the placement of transmission line structures on prime agricultural land, but will not prevent current uses.

Construction "best management practices" (BMPs) will be required to control wind and water erosion and storm water drainage. Although water erosion potential is slight, the area is subject to moderate winds that could erode loose soils during grading and excavation construction activities. Wind erosion will be controlled by watering the loose soil until final soil placement and compaction is achieved. Excavation and grading may also be suspended during periods of high winds. Other general BMPs employed during construction include the use of temporary drains and swales, silt fencing, hay bale barriers, and sand bag barriers as appropriate.

Following construction of the linear facilities, the applicant proposes permanent BMPs, including revegetation of disturbed areas using locally prevalent plant species. The EAEC site will be surfaced using either crushed rock, paving, or grass, and storm water will flow into grass-lined channels located around the perimeter of the site. Storm water collected by the perimeter channels will pass through an oil/water separator before being retained in the storm water retention basin. Discharge from the storm water retention basin will be into the existing drainage channel that runs along the eastern boundary of the site, which ultimately drains and discharges to the intake channel of the Delta-Mendota Canal. Hazardous materials will be stored in covered enclosures, or if outside, will have secondary containment to protect the stormwater from potential contamination (that would result if there were an accidental spill and release of hazardous materials from the storage facilities) (EAEC 2001a, AFC Sections 2.2 & 8.9; EAEC 2001p, SWPPP and EAEC 2001x, SWPPP Drawings).

If appropriate BMPs are required and implemented, no significant adverse impacts to soils are expected as a result of construction and operation of the EAEC. Staff is recommending **Condition of Certification SOILS & WATER 2** to ensure no adverse impacts occur due to erosion or offsite sedimentation.

Soils and Groundwater Contamination

As discussed earlier, the recognized conditions identified in the Phase I ESA appear to be localized effects that are the result of hazardous material handling practices associated with previous agricultural activities. The area of localized contamination (at one of the residences on the overall 174-acre parcel) is not in the direct vicinity of where ground will be disturbed for construction of the EAEC. Therefore, no potential contamination impacts to soil and groundwater are expected to occur during the course of construction and operation of the EAEC as a result of existing materially recognized environmental conditions.

Hazardous materials used during construction will be stored within areas having secondary containment and/or cover. Hazardous materials used during operation will be stored primarily within covered areas, except for storage of calcium chloride, hydrogen and sulfuric acid, which are planned for storage outside. Secondary containment structures will be designed in accordance with Article 80 of the Uniform Fire Code, and will consist of reinforced concrete. Secondary containment in covered areas will be sized to store 100% of the volume of the contents in the primary tanks. Secondary containment in outside storage tanks exposed to storm water will be sized to also include the rainwater from a 25-year, 24-hour storm. Rain water and washdown water within hazardous material storage containment areas will be conveyed through an oil/water separator into the main plant sump, and pumped to the cooling tower basin where the water will be reclaimed for use as cooling tower makeup. No potential contamination impacts to soil and groundwater are expected to occur during the course of construction and operation of the EAEC as a result of hazardous material storage and use (EAEC 2001p, Data Responses 70, 99 and 100).

Groundwater

The EAEC does not propose to use groundwater as a source of supply. The use of either fresh or recycled surface water will have no effect on groundwater supply.

Therefore, groundwater supplies will not be depleted. Due to the occurrence of shallow groundwater, the applicant proposes a mounded septic system to be constructed and operated to County requirements. Staff is recommending **Condition of Certification SOILS & WATER 4** to ensure compliance with applicable requirements and protection of groundwater. As a result of these project elements and staff's proposed Condition of Certification, no significant adverse impacts to groundwater are anticipated.

Surface Water Hydrology

No natural streams or rivers will be altered as a result of the EAEC development, thus avoiding permitting under Sections 404 and 401 of the Clean Water Act. However, as part of the development of water supply to EAEC, a limited length of BBID's Canal 45, which is presently unlined, would be lined with concrete. The lining would be installed under dewatered conditions within the man-made canal and would not present an impact to water quality. Likewise, the proposed directional drilling under the Delta-Mendota Canal for the fresh water pipeline, would not cause an impact to water quality, as the construction method avoids disturbance to water and its quality within the canal.

The EAEC site is not within the 100-year flood plain. The only project feature that nearly intersects the 100-year flood plain is a portion of the proposed recycled waterline from MHCS D at Wicklund Road. The FEMA designated 100-year flood plain in the project vicinity occurs within approximately 2,000 feet of the south bank of Old River. Upon construction of the MHCS D wastewater treatment plant and the recycled waterline, the grade will be re-established so as to avoid any potential effects of flooding within the 100-year flood plain. The EAEC will not create any substantial new impoundment of water that could potentially cause flooding. Therefore, the EAEC is not considered to cause any negative impacts on surface water hydrology or flood routing.

Storm water

Drainage at the EAEC site will be designed to prevent flooding of permanent facilities and roads, both onsite and offsite, and to maintain storm water flows at or below pre-project flows. In order to compare pre and post-project storm water runoff under the change in site ground conditions, runoff was calculated for 32.5 acres of the site, which represents the non-process portion of EAEC. The non-process area, consisting of the portion of grounds where no hazardous materials are handled or stored, will discharge its storm water off-site. The calculated pre and post-project storm water runoff is summarized in **Soils and Water Table 8**.

Soils & Water Table 8
Comparison of Pre & Post-Project Storm Water Discharge

Return Period of Storm (Years)	Rainfall for 24-hour Storm (Inches)	Pre-Project Discharge from Site (cfs –[af])	Post-Project Runoff Developed on Site (cfs)	Attenuated Post-Project Discharge from the Detention Basin (cfs)
10	2.6	12.4 [6.86]	27.0	< 12.4 cfs
25	3.1	15.2 [8.24]	32.3	< 12.4 cfs
50	3.5	17.7 [9.46]	36.9	< 12.4 cfs
100	3.9	19.9 [10.46]	40.9	12.4 cfs

Cubic feet per second (cfs); Acre feet (af)

Source: (EAEC 2001a, AFC Section 8.14 and EAEC 2001z, Tables 3.1 & 4.1)

Storm water developed over the 40 acres for the EAEC generation facilities will be managed separately between areas containing chemicals or oil-filled equipment (process areas) from areas not posing a potential for hazardous material spill (non-process areas). Open process areas will be curbed to contain the maximum 25-year, 24-hour design storm runoff in addition to the volume of the largest storage container. Storm water drainage will be conveyed to an oil/water separator, and then into the cooling tower basin. The system of individual containments and the routing of process area storm water to the cooling tower basin, will serve to maintain storm water flows incrementally below pre-project levels.

Storm water from non-process areas will be conveyed through an oil/water separator into the storm water detention pond, sized for a capacity of approximately 7.5 acre-feet. The storm water detention pond will serve to detain runoff, and attenuate the discharge of runoff to no greater than flows associated with a 10-year, 24-hour event for pre-project conditions (≤ 12.4 cfs). This would be true for all post-project conditions of 24-hour storms associated with 10, 25, 50 and 100-year recurrence frequencies, consistent with the criteria specified by the Alameda County Flood Control and Water Conservation District.

Discharge will pass into the existing drainage channel along the eastern boundary of the EAEC site, which flows northerly into the intake channel of the Delta-Mendota Canal. Storm water discharges would be further reduced by implementing staff's recommended recycling of storm water to the cooling tower basin as specified in **Condition of Certification SOILS & WATER 7**. Storm water will be managed in accordance with the Storm Water Pollution Prevention Plans (SWPPP's) prepared for construction and industrial activities, under the General NPDES Permit for Discharges of Storm Water Associated with Construction and Industrial Activity respectively. These NPDES Permits are administered by the Central Valley – Sacramento Office of the RWQCB. Staff is recommending **Conditions of Certification SOILS & WATER 1 and 3** to ensure compliance with the requirements of this program and proper implementation of SWPPP's for both construction and operation of the project.

Raw Water Supply

Changes in BBID's Historic Use

Once acquired, an appropriative water right is maintained only by continuous beneficial use of the water. Regardless of the amount claimed in the original notice of appropriation or at the time diversion and use first began, the amount which can at any time be rightfully claimed under an appropriative right initiated prior to December 19, 1914, becomes fixed by actual beneficial use as to both amount and season of diversion.

Defining amount and season of diversion can be accomplished by specifying water volumes or ranges of flow diverted by month. The conditions under which an appropriative water right can be forfeited in whole or in part include "due to nonuse" or failure to put water to beneficial use for a period of several years. The courts (*Smith v. Hawkins* (1895) 110 Cal. 122) and the California Water Code (Section 1241) define this period as five years or more.

In order to assess if the EAEC will create any significant change in the historic patterns of use, staff reviewed a summary of BBID's average monthly use of water over a 32-year period between 1969 – 2000, along with projections of initial fresh water use by EAEC (see **Soils & Water Table 9**).

Soils & Water Table 9
BBID's 1969 – 2000 Historic Average Monthly Water Demands with Projected Supply to EAEC (Acre-Feet)

Month	BBID's Avg. Historic Demands	Initial Supply To EAEC (2005)	Total – BBID Demands with EAEC (2005)	% Increase from Historical Demand due to EAEC
January	163	306	469	188%
February	292	276	568	95%
March	1,268	306	1,574	24%
April	3,460	296	3,756	9%
May	6,077	306	6,383	5%
June	7,223	545	7,768	8%
July	7,305	564	7,869	8%
August	6,516	564	7,080	9%
September	3,871	545	4,416	14%
October	1,131	306	1,437	27%
November	41	296	337	721%
December	29	306	335	1,055%
Total	37,113	4,616	41,729	12%

Source: EAEC 2002a, Data Request #135

In reference to BBID's historic demands, it appears that water supply to EAEC will change BBID's existing and historical patterns of water use, particularly during the months of November – February each winter. The AFC indicates BBID's normal maintenance schedule for their canals requires them to be shut down from November through March for cleaning of aquatic weeds and canal bank reshaping, which explains why BBID's historic use during these months is so low. If BBID were to supply the EAEC with fresh water year-round, it would result in a drastic change in BBID's water deliveries for these winter months. During normal and wet hydrologic conditions, the change in BBID's season of use to higher diversions in winter could be viewed as a positive result, because generally water is available for diversion in excess of natural flows in the Delta. However, during dry hydrologic conditions, even winter flows in the Delta may not be adequate to meet all demands of existing water users and their entitlements. However, with implementation of staff's recommendations for full use of recycled water by EAEC (see below), staff believes that any concerns regarding a potential change in the season of use caused by EAEC are moot.

Sufficiency of Raw Water Supply and Impacts to Downstream Users

Title 20, California Code of Regulations, Appendix B (14)(e) (i) requires an applicant to describe the effects of the project demand on the water supply and other users of this source. In addition, Section 1742 (b) of the regulations state that "...the commission staff and all concerned environmental agencies shall review the application and assess

whether the report's list of environmental impacts is complete and accurate, whether the mitigation plan is complete and effective, and whether additional or more effective mitigation measures are reasonably necessary, feasible and available."

As discussed in Staff's preliminary assessment, DWR had previously advised staff that it may protest BBID's plans to supply EAEC with fresh water considering the apparent change that would be caused in BBID's quantity and season of use. DWR had expressed that its beneficial uses under the SWP, or other Delta beneficial uses including maintenance of plant life, fish and wildlife, could be injured as a result of this increased diversion by BBID (CEC 2001i, page 1). DWR is responsible for maintaining Delta water quality consistent with the initiatives developed under CalFed, particularly during the most critical period of summer as typically occurs between late June through early September. Since the Preliminary Staff Assessment was published, DWR and BBID have entered into an agreement that addresses DWR's concerns and BBID's expanding water and service area needs (DWR 2002b). As stated in this agreement, BBID will be allowed to divert no more than 50,000 afy under their existing right from the SWP facilities. BBID initially claimed an entitlement to fresh water of 60,000 afy under its Pre-1914 Appropriative Right. The agreement to limit BBID's fresh water diversion to no more than 50,000 afy appears to be more in line with BBID's historic use. Not considering the demands by EAEC, BBID's projected average annual water demand is expected to approach if not exceed the agreed limit of 50,000 afy within the life of the EAEC project.

During 2000, BBID served approximately 31,000 acre-feet to its agricultural customers, and 700 acre-feet to its industrial customer, for a total supply of 31,700 acre-feet for the year. Excluding EAEC, BBID has either committed or is planning to commit fresh water supply to new customers as shown in **Soils & Water Table 10**. BBID's projected demands show an increase in the annual quantity of water to be used in the district, primarily as the result of an increase in municipal and industrial customers.

Soils & Water Table 10
BBID's Projected Average Annual Water Demands, 2000 - 2040 (afy)
(Using the Applicant's Projected Estimates of EAEC's Fresh Water Demands
& Recycled Water Availability)

Demand Type	2000	2010	2020	2030	2040
Agricultural Use	31,000	34,300	31,400	28,500	25,600
Municipal & Industrial Use					
Discovery Bay West	-	500	500	500	500
Unimin Industrial Use	700	1,500	1,500	1,500	1,500
Mountain House	-	4,641	9,415	9,415	9,415
Tracy Hills	-	6,000	6,000	6,000	6,000
East County Airport	-	1,100	1,200	1,200	1,300
Byron	-	500	600	700	700
Subtotal – Municipal & Industrial Use	700	14,241	19,215	19,315	19,415
Total – Agric. , Muni. & Indus. Use	31,700	48,541	50,615	47,815	45,015
Plus <u>Average</u> Annual Raw Water Use by EAEC* (based on 4,616 afy water demands)	-	2,806	1,732	1,732	1,732
BBID's Projected Demands based on EAEC Average Water Demands	-	51,347	55,215	49,547	46,747
<u>Peak</u> Annual Raw Water Use by EAEC* (based on 7,000 afy water demands)	-	5,190	4,116	4,116	4,116
BBID's Projected Demands based on EAEC Peak Water Demands	-	53,731	54,731	51,931	49,131

Source: (EAEC 2001a, AFC Section 7.1)

* Assumes some recycled water use by EAEC as proposed by Applicant in Soils & Water Table 7.

Shaded areas denote demands projected to exceed BBID's fresh water resources of 50,000 afy.

Staff has inquired as to the status of development of the two largest new customers, Mountain House and Tracy Hills. Mountain House is initiating residential construction of the first of twelve phases. The proposed Tracy Hills development has been annexed by the City of Tracy, is included in the City's approved General Plan, its EIR has been certified under CEQA, and a specific development plan has been approved by the City of Tracy. Staff also understands that BBID has annexed the approximately 2,000 acres for the proposed Tracy Hills development into its service area. BBID would supply raw water to City of Tracy for treatment and distribution to Tracy Hills.

Staff recognizes that at the time the application was submitted, BBID claimed a pre-1914 right to 60,000 afy of raw water from the Delta. As a result of the agreement between DWR and BBID, BBID may divert only 50,000 afy. Considering this change, staff believes that the applicant's determination of effects on water supplies and other users of this source is no longer accurate. Staff was recently informed by BBID that they have adjusted their projected demand downward, yet staff lacks information regarding this adjustment and believes a more conservative assessment of impacts is appropriate in this case. We, therefore, rely on the information provided to staff by the applicant and BBID earlier in this proceeding to determine EAEC's possible impact.

As requested by the applicant, staff considered impacts associated with EAEC using 100 percent raw water and no recycled water. The effect on BBID's total system demands is as shown in **Soils & Water Table 11**.

Soils & Water Table 11
BBID's Projected Average Annual Water Demands, 2000 - 2040 (afy)
(Assuming 100% Fresh Water for Supply to EAEC)

Demand Type	2000	2010	2020	2030	2040
Other BBID Agric, Muni. & Indus. Use	31,700	48,541	50,615	47,815	45,015
Plus <u>Average</u> Annual Raw Water Use by EAEC* (based on using only fresh water)		4,616	4,616	4,616	4,616
BBID's Total Projected Demands based on EAEC Average Water Demands		53,157	55,231	52,431	49,631
<u>Peak</u> Annual Raw Water Use by EAEC* (based on using only fresh water)		7,000	7,000	7,000	7,000
BBID's Total Projected Demands based on EAEC Peak Water Demands		55,541	57,615	54,815	52,015

Source: (EAEC 2001a, AFC Section 7.1)

Shaded areas denote demands projected to exceed BBID's fresh water resources of 50,000 afy.

Under this scenario, and assuming EAEC's average annual demands, BBID's total system demands are projected to exceed supply by about 3,157 afy in 2010, 5,231 afy in 2020 and 2,431 afy in 2030. Under a scenario where EAEC's peak annual water demands are met entirely with fresh water, BBID's total system demands are projected to exceed supply by about 5,541 afy in 2010, 7,615 afy in 2020, 4,815 afy in 2030 and 2,015 afy in 2040. When EAEC's proposed raw water demand is added to BBID's other demand projections, staff finds that there is insufficient fresh (raw) water supplies to serve all of BBID's demands as early as 2010 and thereafter for essentially the balance of the life of the project (the next 25 years) for both average and peak annual. If EAEC's proposed use of raw water is approved, staff believes that it may diminish local fresh water supplies, potentially depriving BBID's other customers of fresh water supplies or result in inadequate supply to the EAEC project itself.

This effect is in conflict with CEQA guidelines as specified under Appendix G – Environmental Checklist Form, Section XVI – Utilities and Service Systems, posing the question, “(w)ould the project: d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed”? Because BBID may be overcommitted in the near future, it is likely that without maximum use of local recycled water there would not be enough water to serve EAEC and BBID's other customers. This would then result in significant adverse impacts to water supplies and to other users of this supply.

Recycled Water from MHCS D

Availability and Feasibility of Recycled Water

At the December 19, 2001 workshop, the applicant affirmed their conditional intent to use recycled water to meet a portion of its demand (at most 60 percent by 2020 and thereafter). Also at this workshop, Mountain House representatives informed staff that all of the recycled water to be produced at the MHCS D wastewater treatment facility can be made available to the project. This resource essentially could meet all the project cooling water demands by 2020 or earlier based on serving EAEC's average annual demands of 4,616 afy (see **Soils & Water Table 12**). MHCS D's willingness to make all

of its recycled water available to EAEC as a first priority was affirmed in their June 20, 2002 letter to the Energy Commission (MHCSO, 2002b).

Soils & Water Table 12 provides an estimate of MHCSO recycled water that could be made available to EAEC, and the amounts of raw water that would be needed in early years to make-up the difference in EAEC demands and recycled water availability.

Soils & Water Table 12
MHCSO's Projected Recycled Water Supplies Available to EAEC
(Assuming Full Use of MHCSO Recycled Water Supply by EAEC)
Fresh and Recycled Water (Average Annual in acre-feet)

Year	2000	2005	2010	2015	2020	2025	2030	2035	2040
MHCSO's Available Recycled Supply	0	890	2,372	3,855	5,337 (Note 2)	6,930 (Note 2)	6,930 (Note 2)	6,930 (Note 2)	6,930 (Note 2)
BBID Fresh Water Supply Needed to Augment Recycled Water	0	3,726	2,224	761					
Total Avg. Annual Use by EAEC	0	4,616	4,616	4,616	4,616	4,616	4,616	4,616	4,616

Note 1: EAEC's Average Annual Demand is projected to be 4,616 acre-feet/year. Beginning in 2018 or 2019, recycled water from MHCSO is projected to exceed the average annual demand. In the event of peak years, raw water may be required, but on a limited basis, for supply augmentation and or back-up.

Note 2: The total amount projected to be available from MHCSO's Recycled Water Supply is shown as an indication of additional water available to meet EAEC peak demands in excess of its average annual demands.

As stated above, the applicant has proposed to use recycled water to meet only a portion of its overall water demand, and would rely on fresh water supplies to meet its water requirements for most of the project's life. As offered by MHCSO, there are no technical reasons that prevent EAEC from using recycled water to meet nearly 100 percent of its cooling and non-potable water demand by 2020 or earlier. Calpine's willingness to implement recycled water in any capacity is subject to it being available under terms and conditions acceptable to Calpine (BBID, 2002e). According to the "Recycled Water Feasibility Study" prepared for the BBID by CH2Mhill in July, 2001, "(t)he integration of potentially available recycled water supplies is a logical extension of the district's water services to its customers" (BBID 2002d, p. 1). BBID evaluated the feasibility of providing its customers with recycled wastewater from MHCSO WWTP and other potential recycled water sources. MHCSO is within the District, is contracted to buy water from BBID, and is interested in finding uses for its tertiary treated water so it can avoid simply discharging to Old River. In this study, BBID also considered recycled water as a potential additional water resource for EAEC.

The report briefly explores the problems associated with the use of recycled water in agriculture and the potential to damage crops due to increased salinity. It is stated in the report that use of recycled water by EAEC for cooling is feasible and with some additional treatment, could be used for process water (BBID 2002d, p. 10). The feasibility study explored recycled water use for three alternatives, namely: agricultural applications of recycled water blended with fresh to reduce salinity; direct agricultural application of recycled water; and industrial use of recycled water. After full consideration, the industrial use alternative was adopted by the BBID Board as the preferred alternative consistent with the recommendations made in the study (BBID

2002d, p. 20). The adopted alternative also notes that, “(b)y focusing the initial development on the EAEC opportunity, the district will be able to start with a single, major customer and potentially build the program in the future.” Noting the region’s anticipated growth in water demand, resulting in an increasing demand on Delta and other surface water resources, staff concurs with BBID that recycled water use for non-potable industrial purposes is superior to use by agriculture.

Benefits of Recycled Water

The benefits of EAEC fully utilizing MHCS D’s recycled water through a delivery arrangement with BBID, and reducing EAEC’s demands of BBID’s fresh water is quantified in **Soils & Water Table 13**.

Soils & Water Table 13
BBID’s Projected Average Annual Water Demands, 2000 - 2040 (afy)
(Resulting From EAEC’s Full Utilization of MHCS D’s Recycled Water)

Demand Type	2000	2010	2020	2030	2040
Other BBID Agric, Muni. & Indus. Use	31,700	48,541	50,615	47,815	45,015
Plus <u>Average</u> Annual Raw Water Use by EAEC* (based on 4,616 afy water demands)		2,224	0	0	0
BBID’s Total Projected Raw Water Demands based on EAEC <u>Average</u> Water Demands		50,765	50,615	47,815	45,015
<u>Peak</u> Annual Raw Water Use by EAEC* (based on 7,000 afy water demands)		4,628	1,663	1,070	1,070
BBID’s Total Projected Raw Water Demands based on EAEC <u>Peak</u> Water Demands		53,169	52,278	48,885	46,085

Source: (EAEC 2001a, AFC Section 7.1)

* Assumes some recycled water use by EAEC as proposed by MHCS D in Soils & Water Table 12.

Shaded areas denote demands projected to exceed BBID’s fresh water resources of 50,000 afy.

Under this scenario assuming EAEC’s average annual demands, BBID’s total system demands are projected to exceed supply by about 765 afy in 2010 and 615 afy in 2020, and likely no exceedance soon thereafter 2020. It should be noted that in 2020, EAEC’s demands do not contribute to, or exacerbate projections of BBID’s demands being in excess of supply. Under a scenario assuming EAEC’s peak annual water demands, BBID’s total system demands are projected to exceed supply by about 3,169 afy in 2010 and 2,278 afy in 2020. Staff believes that if EAEC were to implement full utilization of MHCS D’s recycled water supply, BBID could achieve additional conservation within its fresh water supply district and potentially develop other sources of recycled water not reflected in **Soils & Water Table 13**, in order to meet its projected demands for other users.

The project’s maximum use of recycled water will result in benefits above and beyond just assuring that there will be sufficient supplies of fresh water to serve other users. It should also be recognized that the quantity of recycled water to be used by EAEC will be relatively consistent on a month to month basis, whereas alternative uses of MHCS D’s recycled water by either agriculture or landscape/golf course irrigation are typically seasonal. Staff estimates that maximal use of recycled water by EAEC would

result in nearly twice the amount of recycled water consumed than compared to agricultural and landscape/golf course irrigation.

Title 20, Chapter 5, Appendix B, subsection (g)(14)(C)(i) of the California Code of Regulations places the burden on the applicant to discuss all other potential sources of water, if freshwater is proposed for cooling purposes, and to explain why these other sources are not feasible. The applicant has failed to show why maximum use of the recycled water made available by MHCSD is infeasible.

Also, EAEC's use of MHCSD's recycled water maintains water quality in the Delta by avoiding or minimizing the discharge of any excess treated wastewater into Old River, which empties into the Delta. Even though the wastewater from MHCSD is tertiary treated, it is expected to be of lesser quality than Delta water. Contra Costa Water District, which draws its water supplies downstream of where the raw water is removed and the MHCSD recycled water, as currently permitted, will discharge, is concerned about indirect impacts to the Delta area from using high quality water for power plant cooling while tertiary treated wastewater is discharged to the Delta. It is their position that fewer impacts would occur to the Delta and ultimately their supply if the recycled water were used by the power plant, and not discharged to Old River, thereby leaving higher quality fresh water in the Delta (CCWD 2002a). Staff finds that if the project were to use only fresh water diverted from the Delta and reclaimed water in turn was discharged to Old River which eventually discharges to the Delta, it is possible for eventual indirect water quality impacts to occur. In turn, staff finds that use of MHCSD tertiary treated water, in lieu of raw water from the Delta, is beneficial by reducing the amount of wastewater return flows to Old River and avoiding increased fresh water diversions from the Delta. The CVRWQCB has indicated that the conservation of fresh water through EAEC's use of recycled water, because it would minimize or eliminate the discharge of wastewater originating from MHCSD to the Delta, and the EAEC's use of a ZLD System, are both measures that the Board would find favorable in that these measures would preserve Delta water quality.

Issues that Could Impede Implementation of Recycled Water Supply

Regarding recycled water use, the Applicant has indicated that the "next steps include further discussions and agreements between BBID and MHCSD, and BBID Board adoption of a recycled water plan. The Applicant is committed to using as much recycled water as BBID can provide for the project's needs" (EAEC 2001a, p. 7-4). To date, neither the applicant nor BBID have entered into any agreements or arrangements with MHCSD despite MHCSD's commitment to ensure that EAEC has all of the recycled water MHCSD can produce (MHCSD 2002b).

Staff notes that the Applicant's commitment to use recycled water is only a conditional one. Based on the MOU between the Applicant and BBID, the Applicant has qualified its commitment to implement recycled water supply based on its sole discretion of whether terms and conditions are acceptable to EAEC (BBID 2002e). Staff is concerned that no action by either BBID or Calpine has been taken to negotiate an agreement with MHCSD for this supply. Furthermore, although the Applicant included consideration of a proposed 4.6 mile pipeline in the AFC that would convey recycled water from MHCSD to the EAEC project, the applicant has failed to provide adequate

evidence to staff that would ensure such a facility is ever built. Staff also notes that the schedule included in the MOU between BBID and Calpine (BBID 2002e) addresses the need to complete “water service” in accordance with the EAEC construction schedule, but does not address recycled water specifically.

As a result of staff’s determination of potential impacts and information regarding the availability of recycled water, staff recommends more aggressive mitigation to avoid or lessen these impacts to other raw water users, finding that these additional mitigation measures are reasonably necessary, feasible and available. In order to mitigate the potentially significant adverse impact on BBID’s fresh water supply, staff proposes full utilization by EAEC of recycled water produced by MHCSO as provided in **Conditions of Certification SOILS & WATER 5 - 9**. This recommendation is consistent with Water Code Section 13550 et al. Specifically, Section 13552.6 of the Water Code identifies that the use of potable domestic water for cooling towers, is a waste or unreasonable use of water if suitable reclaimed water is available and the water meets the requirements set forth in Section 13550, as determined by the SWRCB after notice and hearing. Those criteria include provisions that the quality and quantity of the reclaimed water are suitable for the use, the cost is reasonable, the use is not detrimental to public health, and will not impact downstream users or biological resources. Section 13552.8 further states that any public agency may require the use of reclaimed water in cooling towers if reclaimed water is available, meets the requirements set forth in Section 13550 as determined by the SWRCB after notice and hearing, that there will be no adverse impacts to any existing water right, and that if public exposure to cooling tower mist is possible, appropriate mitigation or control is provided.

Any delay in the construction of the recycled water supply facilities or lack of full use of recycled water produced by MHCSO could result in an insufficient water supply to serve EAEC before 2010, or impact BBID’s other water customers. Based on conservative estimates of recycled water production from MHCSO, staff believes this significant adverse impact can be mitigated by EAEC using the maximum amount of recycled water produced by MHCSO for its non-potable requirements. Maximum utilization by EAEC of MHCSO’s recycled water would reduce the potential duration of significant adverse impact to BBID’s water supplies to a period between 2010 – 2020, considering both average and peak water demands by EAEC. On the basis of EAEC’s average annual water demands, BBID might only experience demands in excess of raw water supplies on the order of about 800 afy or 1.5% in excess of its maximum annual supply of 50,000 afy. This incremental reduction in raw water use would result in impacts on raw water supplies and other users of those supplies, but staff believes BBID can address these reduced impacts through conservation improvements and the development of other recycled water resources in the area. Considering the lack of assurances by the Applicant to ultimately implement recycled water supply to EAEC, staff recommends the adoption of **Conditions of Certification SOILS & WATER 5 – 9**, providing assurance that recycled water supply will indeed be implemented. The basis for including requirements for assuring implementation of maximum recycled water supply to EAEC is as follows:

1. Any delay in the construction of the recycled water supply facilities and or lack of full use of recycled water produced by MHCSO (to the extent of EAEC’s water supply

demands) could result in insufficient water supplies needed to serve EAEC before 2010, or otherwise impact BBID's other water customers.

2. MHCSO is a willing supplier of recycled water to BBID, the local water purveyor, and MHCSO has committed to provide all of the recycled water it produces for use by EAEC to the extent EAEC has demands for such use.
3. BBID, as the local water purveyor, is willing to supply EAEC with recycled water. In support of this endeavor, BBID has adopted a Recycled Water Policy, and executed an MOU with the Applicant.

On-Site Water Storage

In its Supplement B to the AFC, the Applicant proposed to reduce the on-site raw water storage capacity (combined for fresh and recycled water) from 10 million gallons to only 5 million gallons. The on-site water storage is intended to supply both plant water makeup needs, and a standby of a minimum of 240,000 gallons for fire suppression based on a flow rate of 2,000 gpm for 2 hours. Considering that at least 5% of the storage (or 250,000 gallons) will be unusable storage in the tank in order to assure that fire water is ultimately available from the bottom of the tank, the remaining usable storage for plant water makeup is about 4.5 million gallons. Based on peak water demands of 6,411 gpm, the 4.5 million gallons of on-site storage only represents about a 12-hour reserve of water supply. In contrast, staff's experience in studying the reliability of recycled water supply for other power plant licensing cases, is that it is common (although infrequent) for wastewater treatment plants like the one constructed to serve MHCSO to experience interruptions in treatment and effluent for up to 24 hours. Furthermore, staff's experience with the reliability of water supply from open canal systems such as will serve EAEC, is that interruptions in supply can occur for more than 24 hours due to maintenance or emergency repairs. Therefore, staff concludes that in order to maintain reliability in water supply, EAEC's on-site storage capacity should be a minimum of 10 million gallons, a volume adequate to supply plant water makeup needs for 24 hours. **Condition of Certification SOILS & WATER 7** includes this requirement for minimum storage. The additional 5 million gallon tank is expected to require a capital investment of about \$3 million based on the Applicant's own estimates (EAEC 200t, Data Request #84).

Reclaimed Stormwater

Stormwater is collected and detained prior to discharge. Stormwater must be of high quality in order to be discharged to surface waters. The high quality required for surface discharge is likely higher than any of the candidate water sources. The applicant could capture and recycle stormwater as part of its water supply conservation measures. Average annual precipitation is 12 inches, and would yield an average annual volume of 29 afy assuming a 90% recovery. A pipeline would be needed from the proposed detention basin to the cooling towers. This would require about 300 lineal feet of approximately 12-inch diameter pipe, and a small pump station with an approximate capacity of 600 gpm in order to recover inflow from the 25-year, 24-hour storm event. This is a very low investment (approximately \$10,000) that will save about one-half percent of the annual water demand and will significantly reduce stormwater monitoring and permitting costs. This will have a positive effect on the region's water balance and reduce the risk of degrading down-stream water quality and beneficial uses. **Condition**

of Certification SOILS & WATER 7 includes a requirement for recovery of storm water as a water conservation measure.

Possible Alternatives to the Proposed Water Supply

The analysis of potential impacts to water resources requires consideration of several alternative water supplies linked with wet cooling technology, along with consideration of dry cooling technology. The following assessment evaluates environmental and cost characteristics of six project alternative configurations integrating water supplies and cooling technologies, which are mutually dependent.

In addition to the opportunity for obtaining recycled water supply from MHCSD, there may also be the opportunity to obtain recycled supply from the Discovery Bay Community Services District (DBCSD) and the City of Tracy, or to significantly reduce project water demands by changing to dry cooling. The City of Tracy stated that they are currently conducting an environmental review of expanding their recycled water production (which is currently discharged to Old River) from 9 mgd to 16 mgd and improving their treatment level from secondary to tertiary. The city requested that the applicant and BBID consider augmenting the cooling water supply with City of Tracy's recycled water until such time as Mountain House could meet the full demand. Staff also notes that City of Tracy's recycled water supply is being considered as an alternative to the fresh water supply proposed for the Tesla Power Plant under a separate Application for Certification proceeding. Discovery Bay had also indicated their interest in making recycled water available to EAEC. Alternative supplies from both City of Tracy and Discovery Bay were analyzed in staff's analysis. The comparison of alternatives is complex, as each alternative provides a range of benefits and impacts. The standard for comparison of fresh and recycled water supplies is specified under Section 13550 of the Water Code, which is reproduced in part as follows:

"The Legislature hereby finds and declares that the use of potable domestic water for non-potable uses, including but not limited to ... industrial ... uses, is a waste or an unreasonable use of the water within the meaning of Section 2 of Article X of the California Constitution if recycled water is available which meets all of the following conditions....:

- 1) The source of recycled water is of adequate quality for these uses and is available for these uses.
- 2) The recycled water may be furnished for these uses at a reasonable cost to the user. (In determining reasonable cost, the State Board shall consider all relevant factors, including, but not limited to, the present and projected costs of supplying, delivering and treating potable domestic water for these uses and the present and projected costs of supplying and delivering recycled water for these uses, and shall find that the cost of supplying the treated recycled water is comparable to, or less than, the cost of supplying potable domestic water.)
- 3) After concurrence with the State Department of Health Services, the use of recycled water from the proposed source will not be detrimental to public health.

- 4) The use of recycled water for these uses will not adversely affect downstream water rights, will not degrade water quality, and is determined not to be injurious to plantlife, fish, and wildlife.”

California Constitution, Article X, Section 2 states that “the water resources of the State be put to beneficial use to the fullest extent of which they are capable, and that the waste or unreasonable use or unreasonable method of use of water be prevented, and that the conservation of such waters is to be exercised with a view to the reasonable and beneficial use thereof in the interest of the people and for the public welfare. The right to water or to the use or flow of water in or from any natural stream or water course in this State is and shall be limited to such water as shall be reasonably required for the beneficial use to be served, and such right does not and shall not extend to the waste or unreasonable use or unreasonable method of use or unreasonable method of diversion.”

Using the above as guidance, staff has prepared an analysis comparing fresh versus recycled water supplies and dry cooling. The analysis considers six alternatives described as follows:

Alternative 1A (Proposed Project – Fresh & Recycled Water) – Wet Cooling using BBID’s fresh water supply augmented by MHCS D’s recycled water supply; BBID would initially supply (in 2005) 3,726 acre-feet/year (81%) from fresh water, and MHCS D would supply 890 acre-feet/year (19%) from recycled water. By 2020 or earlier, MHCS D’s recycled water supply would provide 4,616 acre-feet/year (100%), assuming full build-out of MHCS D.

Alternative 1B (Proposed Project – Fresh Water Only) – Wet Cooling using BBID’s fresh water supply; BBID would supply initially and in all years an average of 4,616 acre-feet/year. This alternative could apply if staff’s proposed conditions of certification requiring implementation of recycled water are not adopted, and the Applicant and/or BBID discretionally chooses not to develop the recycled water pipeline from MHCS D for supply to EAEC. Calpine asked staff to evaluate this alternative.

Alternative 2 – Wet cooling using Discovery Bay Community Service District’s (DBCSD’s) recycled water supply and BBID’s fresh water supply; DBCSD would supply about 2,352 acre-feet/year (51%) recycled water and BBID would supply about 2,248 acre-feet/year (49%) fresh water for the life of the project.

Alternative 3 – Wet Cooling using MHCS D’s and Discovery Bay Community Service District’s (DBCSD’s) recycled water supplies; This alternative still requires some limited supply of fresh water from BBID (up to 1,710 acre-feet/year in 2005) during initial years of EAEC operation, and diminishing to zero by about 2010. MHCS D and DBCSD would provide recycled water supply of 890 afy and 2,016 afy respectively during 2005, and all 4,600 acre-feet/year (100%) of project non-potable water needs by about 2010.

Alternative 4 – Wet cooling using City of Tracy’s recycled water supply; City of Tracy would supply all 4,600 acre-feet/year (100%) of project non-potable water needs beginning in 2005.

Alternative 5 – Dry cooling using BBID’s fresh water supply, reducing non-potable water demands from 4,600 to 83 acre-feet/year;

A comparison of wet vs. dry cooling for the EAEC is summarized in **Soils and Water Table 14**.

Soils & Water Table 14		
Comparison of Cooling Tower Environmental & Performance Characteristics		
Environmental Impact	Wet Cooling	Dry Cooling
Water Requirement	High fresh water supply and treatment requirements (4,600 afy)	None for Cooling (83 afy, primarily for steam production)
Water Discharge	High discharge and treatment requirements	None
Plant Efficiency/Fuel Supply	Baseline	Lower plant efficiency or higher fuel demand (Up to a 4% reduction in capacity, or 46 MW)
Plant Emissions	Baseline	Highest for same output
Auxiliary Power Requirements	Some from fans and pumping	Greatest compared to wet and wet/dry
Secondary Emissions – cooling tower drift	Some salt deposition from Cooling Tower drift	No salt deposition or secondary emissions
Land Requirements	Least of cooling tower alternatives (4 acres)	Moderately more than wet and wet/dry (5 acres)
Visual Impact -Structural	Least of cooling tower alternatives (1,027' long, 54' wide, 43' high)	Taller and larger structure compared to wet and wet/dry (661' long, 207' wide, 120' high)
Visual Impact -Plume	Visible plume, function of ambient temperatures	No plume
Noise	Least of cooling tower alternatives	Can be higher than wet and wet/dry (65 – 70 dBA @ 400')

The application of a dry air-cooled condenser system is technically feasible and can significantly reduce (99% reduction) the use of water for the EAEC compared to the wet evaporative cooling system proposed (EAEC 2001t, Response to Data Request #84).

Results of the analysis comparing capital and operating costs on a relative basis for Alternatives 1A, 1B and 2 through 5 are summarized in **Soils and Water Table 15**.

Soils & Water Table 15

Water Supply/Cooling Alternatives - Comparison of Capital & Operating Costs

Cost Component	Alt. 1A	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5
	MHCSD & BBID	BBID	DBCSD & BBID	MHCSD & DBCSD	City of Tracy	Dry Cooling, BBID
	Fresh & Recycled	Fresh Only	Fresh & Recycled	Fresh & Recycled	Recycled	Fresh Only
Tertiary Treatment of Source Water	\$0	\$0	\$5,000,000	\$5,000,000	\$1,400,000	\$0
	(24" Dia, 2.1 Miles)	(24" Dia, 2.1 Miles)	(24" Dia, 2.1 Miles)	(24" Dia, 2.1 Miles)		(12" Dia, 2.1 Miles)
Water Conveyance - Fresh Water	\$6,000,000	\$6,000,000	\$6,000,000	\$6,000,000		\$2,000,000
	(24" Dia, 4.6 Miles)		(24" Dia, 7 Miles)	(24" Dia, 11.6 Miles)	(24" Dia, 10 Miles)	
Water Conveyance - Recycled Water	\$8,000,000	\$0	\$12,000,000	\$20,000,000	\$17,200,000	\$0
EAEC Water Treatment	\$9,863,000	\$9,863,000	\$9,863,000	\$9,863,000	\$9,863,000	\$1,500,000
EAEC Water Treatment Additions or Savings	\$0	\$0	\$1,308,000	\$1,308,000	\$1,308,000	
Annual EAEC Water Treatment Operations	\$1,109,000	\$1,109,000	\$1,580,000	\$1,580,000	\$1,580,000	
Pres. Value of Annual Water Treatment Op's	\$14,724,941	\$14,724,941	\$20,978,725	\$20,978,725	\$20,978,725	\$0
	(600 AF x \$100/AF)	(4600 AF x \$100/AF)	(2248 x \$100/AF)	(100 x \$100/AF)		(83 AF x \$60/AF)
Annual Water Purchase Cost - Fresh	\$60,000	\$460,000	\$224,800	\$10,000	\$0	\$5,000
Pres. Value of Annual Water Purch's	\$796,660	\$6,107,730	\$2,984,821	\$132,777	\$0	\$66,388
	(4000 AF x \$48/AF)		(2352 x \$48/AF)	(4500 AF x \$48/AF)	(4600 AF x \$0/AF)	
Annual Water Purchase Cost - Recycled	\$192,000		\$113,000	\$113,000		\$0
Pres. Value of Annual Water Purch's	\$2,549,313	\$0	\$1,500,377	\$1,500,377	\$0	\$0
Wet Cooling Tower (excl Pipeline & Wtr Trtmt)	\$32,337,000	\$32,337,000	\$32,337,000	\$32,337,000	\$32,337,000	\$0
Annual Wet Cooling Operating Costs	\$720,000	\$720,000	\$720,000	\$720,000	\$720,000	\$0
Present Value of Wet Cooling Op's	\$9,559,925	\$9,559,925	\$9,559,925	\$9,559,925	\$9,559,925	\$0
Dry Cooling Tower (excl Pipeline & Wtr Trtmt)	\$0	\$0	\$0	\$0	\$0	\$79,700,000
Annual Dry Cooling Operating Costs	\$0	\$0	\$0	\$0	\$0	\$246,000
Present Value of Dry Cooling Op's	\$0	\$0	\$0	\$0	\$0	\$3,266,308
Subtotal - All Capital Costs	\$56,200,000	\$48,200,000	\$66,508,000	\$74,508,000	\$62,108,000	\$83,200,000
PV of All Costs (2001 \$, 7%, 30 Years)	\$83,830,840	\$78,592,596	\$101,531,849	\$106,679,804	\$92,646,650	\$86,532,696
Avg. Annual Rate of Total Costs	\$6,313,669	\$5,919,154	\$7,646,810	\$8,034,525	\$6,977,626	\$6,517,158
Incremental Power Prod. Cost (\$/KWH)	\$0.00097	\$0.00091	\$0.00117	\$0.00123	\$0.00107	\$0.00100

- 1) Avg. Annual Generation is estimated at 6,530,580 MWH/yr assuming a Capacity Factor of 70% x 1,065 MW x 8,760 Hours/yr;
- 2) Annual lost power generation associated with Alt. 5 - Dry Cooling is estimated to average 26 MW x 3,000 Hours/Year = 78,000 MWH/Year
- 3) Costs used in this analysis are primarily the cost data supplied by the Applicant (EAEC 2001t, Response to Data Request #84) and revised according to the Applicant's PSA Comments, Set 1.
- 4) For Alternative 1A, although fresh water would be phased out to the greatest extent by 2020, a weighted average use of 600 afy over 30 years was used for economic consideration.
- 5) A rate of \$48/AF for recycled water was used assuming BBID's purchase from MHCSD based on the Applicant's estimate as as provided in Data Response #86 (EAEC 2001p, page 30).
- 6) A rate of \$100/AF for fresh water purchased from BBID was used based on BBID's indication to staff as documented in (CEC 2002aa)

In comparing Alternatives 1A and 1B, the proposed project using combined recycled water for non-potable requirements augmented by fresh water (Alt. 1A) results in an investment of approximately \$5 million more (\$84 million vs. \$79 million) over the 30-year life of the project. Converting these costs to annual expenses results in a difference of about \$400,000/year. Considering the incremental effect of water supply and treatment on power production costs, Alternative 1A results in a minimally detectable difference of \$0.00006/KWH.

Results of the overall analysis comparing various water supply and cooling alternatives in terms of environmental and cost considerations, are summarized as follows:

Soils & Water Table 16
Summary of the Water Supply and Cooling Alternatives

Issue or Measure	Alt. 1A	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5
	Wet Cooling MHCSD Recycled & BBID Fresh Water Supplies	Wet Cooling BBID Fresh Water Supplies	Wet Cooling DBCSD Recycled & BBID Fresh Water Supplies	Wet Cooling MHCSD, DBCSD Recycled & BBID Fresh Water Supplies	Wet Cooling City of Tracy Recycled Water Supply	Dry Cooling BBID Fresh Water Supply
Ultimate Dependency On Fresh Water (afy)	3,726 – 0 by 2020	4,616	2,248	1,710 – 0 by 2010	0	83
Water Quality before Treatment (TDS in mg/l)	174 - 573	174	748	1,000	1,020	174
Effect of Recycled Water Use to Public Health	None (Will be Tertiary Treated per Title 22)	Not Applicable	Need Tertiary Treatment of DBSCD's Wastewater	Need Tertiary Treatment of DBSCD's Wastewater	Planning Tertiary Treatment	Not Applicable
Adverse Effects to Downstream Water Rights	None	None	None	None	None	None
Degradation to Water Quality	No Significant Impact; No change compared to existing conditions	Slight Degradation No Significant Impact	Improved by avoiding DBCSD existing discharge	Improved by avoiding DBCSD existing discharge	Improved by avoiding existing Tracy discharge	No Significant Impact
Injury to Plantlife, Fish & Wildlife	No Significant Impact	No Significant Impact	No Significant Impact	No Significant Impact	No Significant Impact	No Significant Impact
Present Value of Capital and Operating Costs	\$84 MM	\$79 MM	\$102 MM	\$107 MM	\$93 MM	\$87 MM
Incremental Power Prod. Cost (\$/KWH)	\$0.00097	\$0.00091	\$0.00117	\$0.00123	\$0.00107	\$0.00100

As a result of this analysis of alternatives, staff found that Alternative 5 – Dry Cooling would result in the most favorable conservation of water resources and is about equivalent to the next most favorable alternative in terms of other environmental impacts when compared to the Applicant's current proposal. However, peaking capacity would be limited by using Dry Cooling, estimated to be reduced by 7.5 MW (0.7%) on an average temperature day, to 46.4 MW (4.2%) on a hot day. Considering the loss of generation capacity/energy and the availability of recycled water, Dry Cooling does not appear to be a necessary alternative if the EAEC where to implement Alternative 1A which would result in only temporary impacts to raw water supplies. This alternative differs from the Applicant's current proposal that is a qualified commitment to use at most 60 percent recycled water from MHCSD under terms acceptable to EAEC.

Of the alternatives considering Wet Cooling, Alternative 1A – Recycled Water from MHCS D augmented by Fresh Water from BBID is an acceptable alternative subject to adopting the Conditions of Certification to assure implementation of 100 percent recycled water use for non-potable project demand. Alternative 1B on the other hand, staff believes would be a waste or unreasonable use of high quality water under the California Constitution Article X, Section 2, and related statutes and policies.

Under Alternative 1A, staff believes that EAEC use recycled water only for cooling and other non-potable requirements no later than 2018, and will no longer rely on fresh water for non-potable requirements. The quality of recycled water originating from MHCS D is adequate to meet EAEC's needs, and the power plant will be designed and constructed to accommodate use of the recycled supply. The recycled water will be treated to tertiary standards in accordance with Title 22 and will have no effects on public health. At this time, no party has claimed potential injury to downstream water rights as a result of the project. DWR had previously indicated its concerns for potential injury to SWP contractors and/or the Delta environment, but has since developed an agreement with BBID to resolve its concerns for potential injury. No significant change to Delta water quality should occur as a result of serving fresh water to EAEC in the interim until recycled supply is adequate, as the SWP will acknowledge BBID's senior water rights and maintain environmental quality controls as prescribed under CalFed. And finally, the cost of supplying recycled water is comparable to, and only slightly more than the cost of supplying solely fresh water (Alternative 1B) over the life of the project. The cost difference between Alternatives 1A and 1B amount to about \$5 million as a present value over the life of the project (compared to an initial plant investment on the order of \$500 million), or \$400,000/year when put in terms of an annual average cost over the 30-year life of the project, or \$0.00006/KWH as an incremental cost of power production. Therefore, staff is recommending Alternative 1A - Recycled Water from MHCS D for all non-potable requirements augmented by Fresh Water from BBID as the most favorable alternative. And finally, the cost of supplying recycled water is within the range of alternatives considered and proposed by the Applicant. It should be noted that staff's recommendation should in no way be interpreted to discourage the development of other sources of recycled water to serve EAEC in addition to MHCS D to reduce raw water use earlier or expand reliability.

STATE STATUTORY AND POLICY GUIDANCE

Staff, in making its recommendations, also relies on statutory findings and policies that show the State's position regarding the protection of water quality, conservation of fresh inland water for certain uses and the pursuit of alternative water resources for non-potable applications. In fact, Section 13146 of the Water Code specifies that State offices, departments and boards in carrying out activities which affect water quality, shall comply with state policy for water quality control unless otherwise directed or authorized by statute, in which case they shall indicate to the state board in writing their authority for not complying with such policy. These policies include both State statutes and adopted policies.

Water Code Section 1254 states "(i)n acting upon applications to appropriate water the board (SWRCB) shall be guided by the policy that domestic use is the highest use and irrigation is the next highest use of water." Staff believes that this guiding

policy codifies a fundamental determination by the state for reserving the highest quality water for the highest uses (domestic and irrigation), particularly in reserving water suitable for potable use for domestic purposes.

Water Quality Control Policy on the Use and Disposal of Inland Waters Used for Powerplant Cooling (adopted by the Board on June 19, 1975 as Resolution 75-58) is the principle policy of the SWRCB that specifically addresses the siting of energy facilities. This policy states that fresh inland waters should only be used for power plant cooling if other sources or other methods of cooling would be environmentally undesirable or economically unsound. This SWRCB policy requires that power plant cooling water should come from, in order of priority: wastewater being discharged to the ocean, ocean water, brackish water from natural sources or irrigation return flow, inland waste waters of low total dissolved solids, and other inland waters. This policy also includes cooling water discharge prohibitions such as land application.

The SWRCB has adopted a policy for maintaining existing high quality waters to the maximum extent possible contained in SWRCB Resolution 68-16. Essentially it states that the existing high water quality must be maintained until demonstrated to the State that any proposed change will be consistent with the maximum benefit to the people of the state and will not unreasonably affect present or future beneficial uses. Any activity which discharges a waste to existing high quality waters will be required to provide the best practicable treatment necessary to assure that pollution or nuisance will not occur and that the highest water quality, consistent with maximum benefit to the people of the State, will be maintained.

State Water Resources Control Board Resolution 77-1 encourages and promotes reclaimed water use for non-potable purposes.

The California legislature's Water Recycling Act of 1991 (Water Code § 13575 et seq.) makes several findings and declarations, including:

The environmental benefits of reclaimed water include a reduced demand for water in the Sacramento-San Joaquin Delta, reduced discharge of waste into the ocean, and the enhancement of groundwater basins, recreation, fisheries, and wetlands;

The use of reclaimed water has proven to be safe, and the State DHS is updating regulations for its use;

The use of reclaimed water is a cost-effective, reliable method of helping to meet California's water supply needs; and

Retail water suppliers and reclaimed water producers and wholesalers should promote the substitution of reclaimed water for potable and imported water in order to maximize the appropriate cost-effective use of reclaimed water in California.

Staff's recommendation that EAEC be required to use 100 percent recycled water for its non-potable requirements at the earliest possible date, but no later than 2020, is consistent with the State's statutory findings and policies for the protection of water quality, conservation of fresh inland water and the use of recycled water.

Wastewater

As proposed, the EAEC will be implementing a zero liquid-discharge system, which effectively treats and recycles all process wastewater streams for reuse within the plant.

The primary waste product of the zero liquid-discharge system is a salt cake, considered a solid and not a liquid waste, which will be hauled by truck for disposal in a landfill. The Applicant has estimated that generation of salt cake will average approximately 3.5 tons/day if using 100% BBID raw water, and 10.3 tons/day if using the proposed blend of raw and recycled water. Staff estimates that 100 percent recycled water use would result in less than 20 tons/day.

Sanitary wastewater will be processed using a septic tank and leach field. Because of the potential for groundwater to be near the ground surface in the vicinity of the EAEC, the leach field will be constructed according to an above ground mound-type design. The mound system will be designed to the requirement of EPA's Design Manual for Onsite Wastewater Treatment and Disposal Systems (EPA No. 625/1-80-012), where it is referred to as the "NoDak" disposal system. In order to develop the NoDak disposal system, the Applicant will need to obtain a disposal permit from Alameda County Environmental Health Department. If the existing ordinances are not changed to accommodate the NoDak disposal system, the Applicant will need to obtain a variance to construct and operate the system (EAEC 2001p, Data Responses 96 and 97). Staff is recommending **Condition of Certification SOILS & WATER 13** to address this uncertainty and insure no adverse impacts occur during the construction or operation of this facility to soil and water resources.

CUMULATIVE IMPACTS

In addition to EAEC's proposed use of fresh water originating from the Delta, two other AFC proceedings are in progress, which are proposing to use fresh water supply from the Delta. Several residential developments are also proposed or under construction in the area. These are summarized as follows:

Soils & Water Table 17
Cumulative Diversions of Delta Water Resources

Project Name	AFC Proceeding #	Annual Average Quantity of Water (Acre-Feet/Year)
Mountain House Dev't	N/A	9,415
East Altamont Energy Center	01-AFC-04	4,616
Tesla Power Plant	01-AFC-20	5,100
Tracy Hills	N/A	6,000
Tracy Peaker Project	01-AFC-16	30
Total		25,161

According to information currently available regarding the Tesla Power Plant, it appears that water diverted to Tesla from the California Aqueduct will be in exchange for groundwater that has been banked by a local water supplier in Kern County. Therefore, there would be no additional diversions of Delta water resources for supply to Tesla Power Plant, but instead there would be increases in banked groundwater withdrawal in Kern County. Another possible supply under consideration for the Tesla project is recycled water from the Tracy wastewater treatment facility. The impacts of additional groundwater withdrawal or other potential impacts to water resources are subject to assessment under the Tesla AFC proceeding.

Power plants are not the only development expected in the area that has the potential to affect water resources. Over the next several years, projected water demand in BBID's service area and areas nearby is expected to increase, primarily to serve the needs of new residential and commercial customers. As stated earlier, BBID projects that this demand will reach 50,615 afy by 2020, without consideration of EAEC's requirements. As agreed between DWR and BBID, the diversions from the Clifton Court Forebay will be limited to 50,000 afy. Calpine proposes primarily to use fresh inland (raw) water that ultimately comes from the Delta until such time as recycled water is available from BBID at which time they anticipate it will meet 50 percent of their demands (assuming recycled water is offered under terms and conditions acceptable to EAEC). Otherwise, Calpine proposes to use 100% fresh water. This proposed use could affect BBID's current customers and any potential future customers of local fresh water in the area served by BBID, such as farmers and or residential customers who must compete for limited high quality supplies and have few if any alternatives to meet their needs. The project will operate for 30-50 years, and this use by EAEC of fresh inland (raw) water could potentially have increasing adverse local and regional effects over time.

Considering the increasing pressures and diminishing supplies of fresh inland water resources in BBID's service area and the local region, staff finds that the use of fresh inland water, when recycled or degraded water resources are available for non-potable needs, represents a potential significant adverse cumulative impact. This impact results in the reduction of fresh water supply available for other uses in the area that lack alternatives to meet their needs. Staff's finding is based on the conclusion that recycled water is clearly available for supply to EAEC, and EAEC's use of raw fresh water is shown to exceed local supplies over time and therefore would result in a significant adverse cumulative impact. The SWRCB has also determined that local surface water supplies in the Sacramento-San Joaquin Delta are already fully appropriated from June 15 – August 31 each year, and not available for new appropriations considered junior in right to those already established (SWRCB, 1998).

As a perspective of existing and projected statewide shortages of fresh water supplies, a number of reports and publications help illustrate the challenges facing California now and in the future to maintain adequate water supplies:

1. DWR's California Water Plan Update 1998 – Every five years, DWR is required to prepare a statewide Water Plan addressing projected demands and supplies, and strategies to meet the state's future water needs. In the last completed Water Plan Update -1998, DWR determined that as of 1995, a 1.6 million afy shortage of water supply existed in California. In 2020, the shortage is projected to be 2.4 million afy (DWR, Bulletin 160-98) (DWR, 2002c).
2. DWR's California Water Plan Update 2003 – DWR has begun to update its assessment of the state's water supplies and demands with its California Water Plan Update 2003. This new plan will look more broadly than before at programs and conditions affecting the state's water resources. These programs will include evaluating the status and interaction of CALFED, the Colorado River Water Use Plan, the Central Valley Project Improvement Act (CVPIA), the State Water Resources Control Board Bay-Delta water rights hearings, hydroelectric project relicensings and global warming, among other programs and conditions (DWR, 2002d).

3. DWR's SWP Delivery Reliability Report – On August 20, 2002, DWR released its Draft SWP Delivery Reliability Report. The analyses contained in the report conclude that the SWP, using existing facilities and operated under current regulations, can deliver an average between 70 and 75 % of the primary contractual supply (defined as the Table A amount) now and in the future. During dry periods, deliveries are projected to be significantly lower. For example, if conditions similar to 1977 were to repeat, SWP deliveries are projected to be about 20% of the primary contractual supply (DWR, 2002e).
4. California Colorado River Water Use Plan – California is charged with bringing its use of Colorado River Water in line with its allocation. California's normal apportionment is 4.4 million acre-feet/year, and at times has used up to 5.4 million acre-feet/year. A plan for implementing water conservation measures and groundwater storage is being implemented over a 15-year period from 2001 – 2016, in order to accomplish a progressive reduction in California's reliance on Colorado River water to within its normal apportionment (Colorado River Board, 2002a).
5. Global Warming – Scientists are recognizing changing trends in our atmospheric conditions that are already showing effects on our water supplies in California. Over the past century, land and sea temperatures have risen by about 1°F. Since 1958, carbon dioxide levels have increased from about 315 parts per million (ppm) to about 370 ppm, from which there appears a correlation that as carbon dioxide increases, land and sea temperatures increases. The effects are already being realized in our state's water supplies as measurements in the Sacramento River system show that water originating from mountain snowmelt has diminished by about 12% over the last century. A compounding effect is that more intense and earlier snowmelt is being realized, making natural flows in river systems less sustainable over the normal April – July period, and less available to divert to beneficial use and storage for later use in the year (Sacramento Bee, 2002a).

Cumulatively in California, fresh water supplies for consumptive uses are diminishing while the demand for high quality fresh water is increasing. CALFED and the CVPIA Programs have provided significant improvements in environmental protection of sensitive or endangered species and improvements in restoring aquatic habitat conditions in some reaches of streams and the Delta. However, a result of this accomplishment is more water appropriated for environmental needs and less water available for consumptive needs. Between 2001 – 2016, water received by California from the Colorado River will be reduced by 1 million afy. The outlook for the SWP is also limited. Assuming no changes in the rules by which the SWP's operations are governed, DWR estimates that during normal hydrologic conditions, its supply to contractors will average 70 – 75% of primary contractual allocations that cumulatively total about 4.3 million afy at 100%, and during a critically dry year like 1977, that supply will be severely limited to a mere 20%. Combined hydropower and water supply projects are realizing similar reallocations of resources during license renewals under FERC's authority, accomplishing significant improvements for restoration of aquatic habitat, and modifying project operations to better mimic natural stream flows for habitat restoration and recreation purposes, while resulting in less water in storage reserves for meeting future consumptive needs.

Staff recommends that the project be required to use all recycled water produced by MHCSD in order to make available as much fresh surface water for higher priority uses such as agriculture and residential uses and avoid or minimize the potential for significant cumulative impacts. In addition, if other sources of recycled water can be developed earlier, staff encourages the Applicant to assist in doing so in order to avoid a potential shortfall in supplies that would necessitate increases in fresh water diversion or depriving residential and agricultural users of fresh water supplies. Adoption of Staff's proposed Conditions of Certification will result in the proposed EAEC being consistent with State policies and conserve limited fresh inland water.

ENVIRONMENTAL JUSTICE

Staff has reviewed Census 2000 information that shows the minority population is less than fifty percent within a six-mile radius of the proposed EAEC project (please refer to Socioeconomics Figure 1 in this Staff Analysis), and Census 1990 information that shows the minority/low income population is less than fifty percent within the same radius. However, there is a pocket of minority persons within six miles that staff has considered for impacts. Based on the Soils and Water analysis, staff has identified a potentially significant adverse cumulative effect to local water supplies resulting from the use of high quality fresh inland water, but with mitigation proposed in the Conditions of Certification, this impact will be reduced to less than significant. Therefore, there is no potential disparate impact on the minority population, and there are no Soils and Water environmental justice issues related to this project.

FACILITY CLOSURE

The EAEC is expected to operate for a minimum of 30 years. Closure options range from "mothballing," with the intent of a restart at some time, to the removal of all equipment and facilities.

The decommissioning plan will be submitted to the Energy Commission for approval prior to decommissioning. Compliance with all applicable LORS, and any local and/or regional plans will be required. The plan will address all concerns in regard to potential erosion and impacts on water quality.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

AGENCY COMMENTS

Alameda County

On October 4, 2001, Staff received a letter from Alameda County that provided comments from various County departments regarding the proposed EAEC. This letter contained several recommendations to be included in the conditions of certification. Staff reviewed these comments and recommendations. Our responses are summarized as follows:

1. *Alameda County provided a number of comments to consider in the preparation of the Drainage, Erosion and Sedimentation Control Plan.*

Response: Staff has ensured that Alameda County will have the opportunity to review and comment on the Drainage, Erosion and Sedimentation Control Plan as specified in Condition of Certification Soil & Water 2.

2. *Alameda County provided a number of comments to consider in the preparation of the design of storm water facilities.*

Response: Staff has ensured that Alameda County will have the opportunity to review and comment on the Storm Water Pollution Prevention Plans for both construction and industrial activities as specified in Conditions of Certification Soil & Water 1 and 3.

Byron Bethany Irrigation District

In its October 8, 2001 letter to Ms. Cheri Davis, the Byron Bethany Irrigation District expressed the following concerns with regard to several Reports of Conversation prepared by staff. BBID's concerns and staff's responses are summarized as follows:

1. *Staff did not appear to recognize that among BBID's water supplied for irrigation purposes, it also supplies water for municipal and industrial purposes.*

Response: Staff recognizes the one existing industrial customer, Unimin, an aggregate processing supplier, is served by BBID.

2. *BBID will not readily agree to an independent purveyor expanding into BBID's service area providing water service that BBID is currently developing.*

Response: Alternative sources of recycled water supply are being investigated because BBID's proposed recycled water supply from MHCSO to EAEC is not adequate to serve the full needs of EAEC, and is ultimately projected to only supply 62% of EAEC's demands by 2020.

3. *BBID states that if an independent purveyor of recycled water should extend water service into the service area of BBID, such action would constitute a taking of property, requiring just compensation, including lost revenues.*

Response: Although BBID cannot offer EAEC a sufficient supply of recycled water either initially or ultimately to meet all of EAEC's needs, staff notes BBID's position is an interpretation of law, for which opposing views have been expressed by the SWRCB and City of Tracy. If this should be an issue in the ultimate water supply scheme for EAEC, staff will further explore this issue.

4. *BBID states that as part of the consideration of any alternative supplies of recycled water to EAEC, that it must be available to the user, and furnished at a reasonable cost to the user in accordance with Water Code § 13550(a)(2).*

Response: Staff recognizes the reference to Water Code § 13550(a)(2), and its conditions, and includes such discussion as part of its analysis. As for the availability of alternate supplies of recycled water to EAEC, staff has simply inquired informally with other local potential suppliers as to their interest to supply recycled water to EAEC in order to evaluate alternatives (including consideration of costs) to the proposed water supply.

5. *BBID states that it is erroneous to conclude that providing potable domestic water to EAEC is an unreasonable use of water within the meaning of Section 2 of Article X of the California Constitution.*

Response: Staff did not form this conclusion. The September 12, 2001 Report of Conversation to which BBID refers, presents a discussion about a hypothetical situation in reference to LORS, and not a conclusion (CEC 2001f, page 1).

6. *BBID states that the Energy Commission must determine if use of any source of recycled water would result in the loss or diminution of existing water rights.*

Response: Staff has included this consideration as part of its discussion under Analysis of Project Related Impacts. See Soils and Water Table 13, and Soils and Water Appendix B.

7. *BBID notes that currently the City of Tracy does not physically have recycled water available to meet the needs of EAEC, observing that the City of Tracy's supply is dependent on expansion of its treatment plant, and that its availability is speculative.*

Response: As stated in the September 13, 2001 Report of Conversation between staff and the City of Tracy, the City of Tracy is planning both capacity as well as treatment upgrades to meet Title 22 tertiary standards, over the next 3-4 years. Existing production in the City of Tracy's wastewater plant is almost double the supply needed by EAEC, requiring only a change in the level of treatment. The level of treatment would need to be improved from secondary to tertiary, with possibly an additional upgrade in the disinfection process to allow unrestricted use of reclaimed water for industrial uses. The City also characterized the likelihood of implementing their wastewater treatment plant upgrades for tertiary treatment as having a 95 percent probability due to state-level political, regulatory and financial support. The City has been allocated an \$8.5 million grant from Proposition 13 funds (AB 1584, signed by the governor on October 7, 1999), and is scheduled to issue its Draft Environmental Impact Report for consideration under CEQA of its wastewater treatment upgrade plans by end of this year. While the availability of tertiary-treated water from the City of Tracy is not 100 percent certain, it appears to be a viable alternative to consider for recycled water supply to EAEC.

8. *In its October 30, 2001 letter to Ms. Cheri Davis, the Byron Bethany Irrigation District clarified its water rights with respect to supply of fresh water to EAEC.*

Response: Staff believes it has represented BBID's water rights to fresh water diversions with respect to quantities and seasons of use as discussed in EAEC

Water Supply – BBID on pages 5.8 -10 through 5.8-12, and Changes in BBID's Historic Use on pages 5.8-17 through 5.8-18.

Discovery Bay Community Services District

Discovery Bay Community District has indicated its interest in supplying recycled water to EAEC.

Response: Staff has included the opportunity for recycled water supply from Discovery Bay Community Services District as Alternatives 2 and 3 in its Possible Alternatives to the Proposed Water Supply as discussed on pages 5.8-27 through 5.8-24.

City of Tracy

In its December 20, 2001 letter to Ms. Cheri Davis, the City of Tracy provided the following comments on the PSA which are summarized as follows:

1. *City of Tracy indicated that they will have adequate capacity of recycled water to serve EAEC, and that the Public Works staff is willing to recommend to the City Council to allow EAEC to purchase recycled water at no cost in consideration of the Applicant contributing for its proportionate share of related capital costs.*

Response: Staff has included in its economic analysis of water supply alternatives the option to use City of Tracy's recycled water for supply to EAEC.

2. *City of Tracy indicated that in staff's economic analysis of water supply alternatives, that it was unnecessary to include a backup fresh water supply.*

Response: Staff agrees with City of Tracy, and has revised its economic analysis assumptions for Alternative 4 - City of Tracy Recycled Water Supply to reflect the City's comment.

Contra Costa Water District

In its January 18, 2002 letter to Ms. Cheri Davis, the Contra Costa Water District (CCWD) provided the following comments on the PSA which are summarized as follows:

1. *CCWD's overall interest is in protection of water quality in the Delta, the sole source of CCWD's water supply for 430,000 people. As such, CCWD has a need for full and accurate disclosure of impacts on water quality.*

Response: Staff recognizes the importance of maintaining Delta water quality, and the direct adverse effect that Delta water quality degradation can have on CCWD's water supply.

2. *CCWD requests that the cumulative impact analysis include consideration of other water projects such as construction of flow and fish barriers in the south Delta and the increase in pumping at the CVP and SWP facilities.*

Response: Staff believes it has adequately analyzed pertinent issues to the licensing of EAEC in its cumulative impact analysis, as well as including staff-proposed

mitigation and conditions of certification that maximize use of recycled water in the interest of maintaining Delta water quality.

3. *CCWD requests that staff incorporate results of water supply and water quality modeling of the Delta into its analysis of EAEC.*

Response: Staff believes it has established a basis to protect Delta water quality without demonstration through numerical modeling by requiring EAEC to maximize use of recycled water as specified in Conditions of Certification Soil & Water #'s 5 – 9.

4. *CCWD does not agree that using recycled water and reducing wastewater return flows into the Delta is similar to increasing fresh water consumption from the Delta.*

Response: Staff has deleted this statement consistent with CCWD's request.

5. *CCWD is actively encouraging the RWQCB to require that all new wastewater facilities in the Delta region include tertiary treatment and minimize disposal to waterways, in consideration of stricter regulations on drinking water and the CALFED goal of improved water quality. CCWD strongly opposes the discharge of contaminated wastewater from Mountain House into the drinking water supply for 20 million Californians.*

Response: Staff has required EAEC to use the maximum amount of tertiary-treated recycled water from Mountain House as specified in Conditions of Certification Soil & Water #'s 5 – 9.

San Joaquin County Board of Supervisors Resolution 406

This resolution states the County's opposition to several proposed consequences of the EAEC including the loss of water to farming and other users as a result of the project's proposed demand.

Response: Staff has determined that Calpine's proposed water supply to EAEC would result in significant adverse impacts to local water supplies and adversely impact other users. As a result, staff is recommending Conditions of Certification that would mitigate these impacts.

PUBLIC COMMENTS

G&DK-4 - *Mr. and Mrs. Kuhn expressed concern regarding the two evaporation ponds as initially proposed for the EAEC.*

Response: The Applicant has since withdrawn the evaporation ponds from its plans, and instead proposes to implement a zero liquid discharge system, which will avoid any open storage or discharge of process wastewater. Instead, all process wastewater will be treated on-site and reused, and a solid waste salt cake will be hauled off-site for landfill disposal.

MS-3 - *This plant will use 4,600 acre-feet of water per year. In a state like California, this is an unconscionable use of water when viable alternatives exist.*

Response: Please refer to staff's discussion of potential impacts caused by water use above. Staff has determined that the use of fresh inland water by EAEC could have a potentially significant adverse impact. Staff is recommending several Conditions of Certification to address these impacts.

MS-4 - *How will the crystallized brine from the water treatment plant be disposed of? How will cooling tower blowdown and other wastewater streams be dealt with?*

Response: Please refer to staff's discussion of the proposed wastewater treatment process and possible impacts above. Most wastewater streams will be recycled *and* the crystallized brine will be directed to either drum dryers or a concentrator resulting in a solid salt cake.

MITIGATION

APPLICANT PROPOSED MITIGATION

Soils

The applicant proposes to incorporate standard BMPs into the project design for construction and operation to mitigate erosion and sedimentation impacts.

Ground water

The applicant has generally described the proposed BMPs for spill prevention and control within the Storm Water Pollution Prevention Plan (SWPPP) to minimize the potential for ground water contamination. No groundwater is to be used by the project.

Surface Hydrology

As proposed, all storm water not routed to the ZLD system is to be directed to the detention pond.

Storm Water

The applicant has submitted a draft SWPPP that generally addresses BMPs. More site specific BMPs will be required in the project design for construction and operation to reduce erosion and sedimentation impacts and their possible impacts to surface water quality. Measures established within the SWPPP regarding spill control would also protect surface water resources. Areas will be curbed or bermed where there is a possibility for runoff to encounter contaminants. The runoff from these portions of the site will be routed through an oil/water separator and then to the ZLD system, eliminating this potential source of polluted runoff. The applicant will be required to meet general storm water requirements of the NPDES permit.

Wastewater Disposal

To reduce water requirements and eliminate wastewater discharges for the project, the applicant has proposed a ZLD system. Sanitary wastewater is to be directed to a mounded septic system and drain field.

STAFF PROPOSED MITIGATION

Soils

Staff recommends that the applicant be required to meet storm water requirements of the general NPDES permit. As required by Central Valley RWQCB Order 99-08-DWQ (Storm water during construction) and Order 5-00-175 (discharge of short duration or low threat), a SWPPP would be implemented to minimize pollutants in stormwater. In addition, the Applicant will be required to develop and implement site specific Drainage, Erosion and Sedimentation Control Plan for the entire project (including ancillary facilities) that address standard erosion runoff and sedimentation impacts for construction, post-construction, and operational phases. This plan will comply with all applicable local requirements. These requirements are addressed in **Conditions of Certification SOILS & WATER-1** and **SOILS & WATER-2**. The applicant must revise the draft plans to provide the following amendments and additions within the final plans for the entire proposed EAEC project:

The topographic features of the proposed project including areas involving all proposed pipeline construction, laydown (staging) area, transmission upgrades, and stockpile location(s). The mapping scale should be at least 1"= 100' (1"=50' recommended). Sufficient surrounding area including the topography and existing features should also be provided on the drawings.

A construction schedule that addresses all BMP installation, maintenance and removal sequences of events from initial site mobilization to final stabilization (i.e. vegetation/asphalt) and plant operation.

Proposed contours should be shown tying in with existing ones. All proposed utilities including storm water facilities should be shown on the plan drawings. All erosion and sedimentation control facilities should be shown on the drawings. The drawings should contain a complete mapping symbols legend that identifies all existing and proposed features including the soil boundary and a limit of construction. The limit of construction boundary should include the project facility, pipeline areas, stockpile areas, laydown areas, and any off-site staging areas. The limit of construction ensures all work is confined to the proposed EAEC project in order to protect all surrounding areas not involved in construction or operation of the proposed project.

Silt fencing and sandbags should be used to trap sediment, and not as runoff conveyance facilities. Earthen berms or channels can be substituted to intercept sediment-laden runoff and direct it into the sediment retention basin/trap. A sediment trap should be used for drainage areas less than five acres and a sediment basin should be used for drainage areas greater than five acres.

All excavated material should be kept away from active flows. Site specific BMPs shall be included in narrative and drawing portions of the erosion and sediment

control plan. The soil should be covered via a liner or anchored mulch. Areas disturbed during construction should be stabilized via permanent vegetation upon completion of the process.

Specific BMPs to be employed for all project-related construction including, but not limited, to access roads, directional drilling / tunneling, linear facilities, and any off-site staging areas are to be shown on legible drawings of appropriate scale.

Proposed vegetative areas and a description of revegetation procedures are to appear on the drawings.

Soil stockpile management BMPs for water and wind erosion.

Maintenance and monitoring protocol for erosion/storm water control.

Ground Water

No ground water is to be used by the project and staff is requiring proper review and approval of the proposed septic system for groundwater protection (see **Condition of Certification SOILS & WATER-4**).

Surface Hydrology

As proposed, the EAEC is to be operated as a 'zero-liquid discharge' facility thereby eliminating the need to obtain a NPDES permit other than for storm water discharges. EAEC will be required to comply with the general NPDES requirements that regulate storm water discharges. The EAEC will supply all information required by the RWQCB and Energy Commission staff to determine compliance with the NPDES requirements for storm water discharge. This includes the required SWPPPs. The applicant will be responsible for all monitoring and reporting guidelines and other provisions included in the general storm water permits. This requirement is contained in **Conditions of Certification SOILS & WATER-1 and SOILS & WATER-3**.

Water Supply

Considering the potentially significant adverse cumulative effects to local water supply and the lack of assurances by the Applicant to ultimately use a recycled water supply for EAEC, staff has included **Conditions of Certification SOILS & WATER 5 – 9**, providing assurance that recycled water supply will indeed be fully implemented. The basis for including requirements for assuring implementation of recycled water supply to EAEC is as follows:

1. MHCSO is a willing supplier of recycled water to BBID who is the local water purveyor, and MHCSO has committed to provide all of the recycled water it produces for use by EAEC to the extent EAEC has demands for such use.
2. BBID, as the local water purveyor, is willing to supply EAEC with recycled water, and in support of this endeavor, has adopted a Recycled Water Policy, and executed an MOU with the Applicant.
3. Any delay in the construction of the recycled water supply facilities and or lack of full use of recycled water produced by MHCSO (to the extent of EAEC's water supply demands) could result in insufficient water supplies needed to serve EAEC before 2010, or otherwise impact BBID's other water customers.

To mitigate any potential adverse impacts to local fresh water supplies or other users of fresh water and address inadequacies of fresh water supplies, staff also is recommending that EAEC be required to use recycled water for 100 percent of all non-potable requirements no later than January 1, 2020 (**Condition of Certification SOILS & WATER 5**).

Process and Sanitary Wastewater

The project will operate with a zero-liquid-discharge system that will eliminate all process wastewater discharge. Since the applicant has proposed no back-up for the ZLD system, staff recommends monitoring of the ZLD system and on-site storage facilities (**Condition of Certification SOILS & WATER 11 & SOILS & WATER 12**) as well as facility shut-down in the event of a disruption to the operation of the ZLD system. Compliance with this condition should ensure proper handling, storage and disposal of wastewater generated at the EAEC.

The on-site septic system and drainfield must be designed according to applicable county laws in order to prevent any significant impacts to water quality. **Condition of Certification SOILS & WATER-13** requires review of the final design plans by the CPM and Alameda County for the protection of water quality. The plans must be approved by the Energy Commission before the start of septic system construction activities.

Storm Water

As stated in the **Surface Hydrology** mitigation discussion above, EAEC will be required to comply with the NPDES requirements that regulate storm water by establishing effluent limitations and monitoring and reporting requirements for construction activities storm water, low-threat or short duration discharge, and the industrial activities (operational) dictated by the storm water general permit. The draft SWPPP will need to be revised to be site specific and comply with the guidelines provided in Water Quality Order 99-08-DWQ and 97-03-DWQ. In addition, staff is recommending that stormwater flows be directed to the cooling process to conserve fresh water resources.

COMPLIANCE WITH LORS

Calpine's proposed EAEC has been considered with regard to applicable laws, ordinances, regulations and standards (LORS). Staff believes that if the proposed Conditions of Certification are required, the project will comply with LORS. For this reason, staff recommends that the project not be licensed without the proposed Conditions of Certification.

CONCLUSIONS

Staff concludes use of only fresh water by the project for non-potable needs would result in a significant adverse impact by diminishing local water supply, potentially depriving BBID's other customers of fresh water or resulting in inadequate supplies to the EAEC project itself. Staff also believes that potentially significant adverse cumulative impacts to other fresh water users (i.e., residential and agriculture) could result if EAEC does not maximize its use of recycled water for cooling and non-potable

requirements. The use of reclaimed water for cooling is well proven and could ordinarily serve 100 percent of the project's non-potable water demands prior to 2020. Several sources of recycled water suitable for meeting EAEC's non-potable requirements are being developed in the area and will be available by as early as 2003. MHCSO has committed to supply all of its recycled water for use by EAEC. Staff also concludes that recycling of the storm water to the cooling tower basin is a reasonable and economic means to conserve water, and will avoid discharge of storm water offsite.

Based on the facts of this case, staff has determined that EAEC's use of high quality fresh inland water for cooling, process water and other non-potable uses when recycled water is available is wasteful, an unreasonable use or unreasonable method of water use. Staff's determination that recycled water use be maximized by EAEC is supported by statutory and policy guidance. The incremental effect of EAEC using recycled water supply on its power production costs, as shown under Alternative 1A, results in a minimally detectable difference of about \$0.00006/KWH over the life of the project compared to using all fresh water (Alternative 1B). The MHCSO recycled water will be treated to tertiary standards in accordance with Title 22, is of a quality sufficient for use by EAEC, and will have no effects on public health. Staff's recommendation that EAEC be required to use 100 percent recycled water for its non-potable requirements at the earliest possible date, but no later than 2020, is consistent with the State's statutory findings and policies for the protection of water quality, conservation of fresh inland water and the use of recycled water.

The proposed EAEC project will comply with applicable LORS, be consistent with established state policy regarding the conservation of fresh water supplies and result in a less than significant impact to other fresh water users if the Conditions of Certification recommended by staff are required. Staff recommends that the project not be licensed without these Conditions of Certification included as part of the license.

PROPOSED CONDITIONS OF CERTIFICATION

The following conditions have been developed for the project:

SOILS&WATER 1: The project owner shall comply with all of the requirements of the General NPDES Permit for Discharges of Storm Water Associated with Construction Activity. The project owner, as required, shall develop and implement a Storm Water Pollution Prevention Plan (SWPPP) for the construction of the entire project. Prior to beginning any site mobilization associated with any project element, the project owner shall submit to the CPM a copy of the Notice of Intent for Construction accepted by the RWQCB and obtain Energy Commission CPM approval of the construction activity SWPPP for EAEC.

Verification: No later than 60 days prior to the start of site mobilization for any project element, the project owner shall submit a copy of the SWPPP required under the General NPDES Permit for Discharges of Storm Water Associated with Construction Activity to Alameda County for review and comment, and to the CPM for review and approval. The SWPPP will include copies of the Notice of Intent for Construction accepted by the RWQCB and any permits for EAEC that specify requirements for the

protection of stormwater or water quality. Approval of the SWPPP by the CPM must be received prior to site mobilization for any project element.

SOILS&WATER 2: Prior to beginning any site mobilization activities for any project element, the project owner shall obtain CPM approval for a site-specific Drainage, Erosion and Sedimentation Control Plan that addresses all project elements. The plan shall address revegetation and be consistent with the grading and drainage plan as required by **Condition of Certification CIVIL-1**.

Verification: No later than 60 days prior to the start of any site mobilization for any project element, the project owner shall submit the Drainage, Erosion and Sedimentation Control Plan to the CPM for review and approval. No later than 60 days prior to start of any site mobilization, the project owner shall submit a copy of the plan to Alameda, Contra Costa and San Joaquin Counties for review and requesting any comments be provided to the CPM within 30 days. The plan must be approved by the CPM prior to start of any site mobilization activities.

SOILS&WATER 3: The project owner shall comply with all of the requirements of the General NPDES Permit for Discharges of Storm Water Associated with Industrial Activity. The project owner, as required, shall develop and implement a Storm Water Pollution Prevention Plan (SWPPP) for the operation of EAEC. The project owner shall submit to the CPM a copy of the Notice of Intent for Operation accepted by the RWQCB and obtain approval of the General Industrial Activities SWPPP from the Energy Commission CPM prior to commercial operation of the EAEC.

Verification: No later than 60 days prior to the start of commercial operation, the project owner shall submit to the CPM a copy of the SWPPP required under the General NPDES Permit for Discharges of Storm Water Associated with Industrial Activity to Alameda County for review and comment, and to the CPM for review and approval. The operational SWPPP shall include copies of the Notice of Intent for Operation accepted by the RWQCB and any permits for EAEC that specify requirements for the protection of stormwater or water quality. Approval of the operational SWPPP by the CPM must be received prior to start of commercial operation.

SOILS&WATER 4: The on-site septic system shall be designed and operated to prevent any adverse impacts to water quality. Prior to construction of the on-site sanitary wastewater treatment facility (septic system), the project owner shall obtain CPM approval for this system. Prior to CPM approval, written confirmation shall be submitted by the project owner from the Alameda County that the proposed facility design meets all applicable County requirements.

Verification: No later than 60 days prior to construction of the on-site domestic wastewater treatment facility for EAEC, the project owner shall prepare detailed engineering drawings for this facility and submit these drawings with a detailed description to the CPM and Alameda County for review. The detailed description shall include information on infiltration rates, existing groundwater quality and depth to groundwater. Within 60 days of submitting the detailed engineering drawings, the project owner shall provide written confirmation to the CPM from the Alameda County that the design meets all applicable County requirements.

SOILS&WATER 5: Total water use by the project owner for the operation of EAEC and associated landscape irrigation shall not exceed an annual average of 4,616 acre-feet, a peak annual demand of 7,000 acre-feet and a peak daily flow of 9.1 mgd. Water used by EAEC shall not adversely impact fresh water supplies to municipal or agricultural customers of BBID. EAEC shall use tertiary treated, recycled water for all of its non-potable operational requirements as soon as possible, **but no later than January 1, 2020**. Until 2020, raw water supplied by BBID from Canal 45 may supplement the recycled water supply to the extent needed. Beginning in 2020 and thereafter, in the event of an unavoidable interruption in recycled water supply, or otherwise should fresh water be needed to support peaking demands, up to 10 percent non-recycled water use will be allowed based on the actual annual EAEC water use for the particular year. **If this specified water supply is not available or the specified limits will be exceeded prior to the end of the calendar year, the project owner shall immediately notify the CPM.** The notification must specify the cause and proposed new source of recycled water, modified cooling technology, or other reasonable solution subject to approval by the CPM.

Verification: In the annual compliance report, the project owner shall submit a report to the CPM that documents the previous year's actual fresh and recycled water use on a monthly basis consistent with requirements of **Condition of Certification SOILS&WATER 8**, distinguishing sources of water and their uses. Annual average will be calculated using actual project water use over consecutive five-year increments starting with the first year of operation.

SOILS&WATER 6: The project owner shall submit to BBID a written request, pursuant to Water Code section 13580.7, to enter into an agreement in order to provide recycled water service to EAEC. After submittal of this request, the project owner shall enter into a Water Supply Service Contract with BBID setting forth the rate and conditions for fresh water and recycled water supply. The contract shall specify that EAEC will have first priority for allocation of recycled water necessary to serve EAEC. The contract shall also set forth each party's responsibility for the design, construction, and funding of the recycled water supply pump station and pipeline from MHCSO. The contract shall be executed prior to the construction of any project structures or facilities and a signed copy submitted to the CPM. The pipeline to convey recycled water from MHCSO's treatment facility to EAEC shall be built prior to the start of plant operation.

Verification: No later than 60 days prior to mobilization, the project owner shall submit proof to the CPM that BBID has received the request. No later than 120 days after the request is submitted the project owner shall submit to the CPM an executed Water Supply Service Contract with BBID for fresh and recycled water supply to EAEC. No later than 30 days prior to plant operation, the project owner shall submit evidence to the CPM that the recycled water supply pipeline has been built and is capable of conveying 5.4 mgd to EAEC.

SOILS&WATER 7: The EAEC project shall include the following specific design features to ensure maximum use of recycled water:

- a) Plant piping shall be installed to allow recycled water to be used for cooling tower makeup and landscape irrigation. Cross connection protection between

raw, recycled, and potable water systems shall be in accordance with Chapter 19, Backflow Prevention and Cross Connection Control, of Title 22, California Code of Regulations as proposed in the March 20, 2002 Draft Cross Connection Control Regulations.

- b) Systems shall be included to facilitate the feed of a second oxidizing biocide (in addition to sodium hypochlorite) and also a non-oxidizing biocide.
- c) The landscaped irrigation system shall be plumbed to use recycled water.
- d) The surface condenser shall be constructed of materials compatible with recycled water.
- e) The recycled water pipeline from the Mountain House Community Services District (MHCS D) to EAEC shall be sized to supply peak EAEC demand with 100 percent recycled water from MHCS D.
- f) On-site raw water storage shall be a minimum of 10 million gallons.
- g) Storm water shall be recycled to the cooling tower basin.

Approval of the final design of the water supply and treatment system by the CPM shall be obtained prior to the start of construction of these systems.

Verification: At least 60 days prior to the start of construction of the water supply system, the project owner shall submit to the CPM its water supply system design demonstrating compliance with this condition. These required features shall be included in the final design drawings submitted to the CBO as required in **Condition of Certification CIVIL-1**. Approval of the final design of the water supply and treatment system by the CPM shall be obtained prior to the start of construction of the systems.

SOILS&WATER 8: Prior to the use of any water by the EAEC, the project owner shall install metering devices as part of the water supply and treatment system to monitor and record in gallons per day, 1) total volumes of each raw and recycled water supplied to EAEC, and 2) volumes used of each source for cooling purposes, potable water treatment system, non-cooling process water supplies, irrigation, wash water, demineralized water and turbine injection. These metering devices shall be operational for the life of the project.

An annual summary of daily water use by EAEC, differentiating between raw, potable and recycled water and the uses of each at EAEC, shall be submitted to the CPM in the annual compliance report.

Verification: No less than 60 days prior to the start of operation of EAEC, the project owner shall submit to the CPM evidence that metering devices have been installed and are operational on the pipelines serving and within the project. These metering devices shall be capable of recording the quantities in gallons of water delivered to EAEC and differentiate between uses of these supplies by EAEC in order to report daily water demand (including irrigation). The project owner shall provide a report on the servicing, testing and calibration of the metering devices and operation in the annual compliance report.

The project owner shall submit a water use summary report to the CPM in the annual compliance report for the life of the project. The annual summary report shall be based

on and shall distinguish recorded daily use of raw, potable and recycled water for all project uses, including landscape and agriculture irrigation. Included in the annual summary of water use, the project owner shall submit copies of meter records from MHCSO documenting the quantities of tertiary-treated disinfected wastewater produced (in gpd) by their treatment plants over the previous year. The report shall include calculated monthly range, monthly average, and annual use by the project in both gallons per minute and acre-feet. For subsequent years this information shall also include the yearly range and yearly average water used by the project.

SOILS&WATER 9: Prior to construction of the fresh water pipeline, the project owner shall provide the CPM with a copy of the Encroachment Permit for the installation of the fresh water pipeline under the Delta-Mendota Canal. Approval by the U.S. Bureau of Reclamation and Delta-Mendota Water Authority must be obtained prior to initiating any directional drilling activities.

Verification: At least 30 days prior to construction, the project owner shall submit to the CPM a copy of the Encroachment Permit issued by the U.S. Bureau of Reclamation and Delta-Mendota Water Authority.

SOILS&WATER 10: Prior to construction of the Fresh Water Pump Station located at Canal 45, the project owner shall submit to the CPM a copy of an approved Building Permit from Contra Costa County Public Works Department, and evidence of having complied with all applicable requirements.

Verification: At least 30 days prior to start of EAEC site mobilization, the project owner shall submit to the CPM a copy of the County approved Building Permit issued by Contra Costa County Public Works Department.

SOILS&WATER 11: Wash wastewater resulting from periodic cleaning of the compressors and heat recovery steam generators shall be contained on-site in a sump with the contents of the sump periodically pumped out by a vacuum truck and transported off-site for disposal at an appropriately licensed facility.

Verification: The project owner, in the annual compliance report, shall provide an accounting summary of the quantity and quality of wash and chemical cleaning water contained on-site, including the frequency of pumping, and the volume of water transported off-site for disposal. The accounting shall include documentation of the analytical reports required for disposal, and pre-treatment processing, if required for disposal.

SOILS&WATER 12: Surface or subsurface disposal of process wastewater or contaminated stormwater from EAEC is prohibited. The project owner shall treat all appropriate wastewater streams with a zero liquid discharge (ZLD) system that results in a residual cake solid waste and recycle stormwater flows to the cooling towers.

Verification: Within 60 days following the commencement of project operations, the project owner shall submit to the CPM the final design of the zero liquid discharge system, including schematic, narrative of operation, maintenance schedules, on-site storage facilities, containment measures and influent water quality. This information shall also include the results of the Waste Extraction Test of the residual cake solid waste from the zero liquid discharge system. In the annual compliance report, the project owner will submit a status report on operation of the zero liquid discharge

system, including disruptions, maintenance, volumes of interim wastewater streams stored on site, volumes of residual cake solids generated and the landfills used for disposal. In the event of ZLD system shutdown or any maintenance affecting the ability for EAEC to continue treatment at the rate of its production of wastewater, the project owner shall submit to the CPM a description of their temporary alternative disposal method for review and approval. In addition, the project owner shall submit to the CPM copies of the annual monitoring report for storm water as normally submitted to the Central Valley RWQCB under the General NPDES Permit for Discharges of Storm Water Associated with Industrial Activity.

SOIL&WATER 13: Potable water for the EAEC shall be provided by an on-site domestic (potable) water treatment system. Prior to installation of the on-site domestic (potable) water treatment system, the project owner shall submit detailed engineering drawings and a narrative description of this facility and its uses to the California Department of Health Services' (DHS) Drinking Water Program for review and approval. A water supply permit approved by DHS' Drinking Water Program for the on-site domestic water treatment facility shall be obtained by the project owner and a copy submitted to CPM prior to use of the system.

Verification: Prior to the installation of the on-site domestic water treatment system, copy of the approved water supply permit issued by DHS shall be submitted to the CPM.

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Burns, John M., PE and Micheletti, Wayne C. November 4, 2000. Comparison of Wet and Dry Cooling Systems for Combined Cycle Power Plants.

CEC (California Energy Commission) 2001a. First Set of Data Requests. Dated and docketed May 10, 2001.

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CEC (California Energy Commission) / John Kessler 2001d. Report of Conversation with Byron Bethany Irrigation District. Dated August 27, 2001 and docketed September 5, 2001

CEC (California Energy Commission) / John Kessler 2001f. Report of Conversation with Andrew Sawyer, Assistant Chief Counsel, SWRCB. Dated September 12,

2001 and docketed October 2, 2001.

CEC (California Energy Commission) / John Kessler 2001g. Report of Conversation with Steven Bayley, Deputy Director of Public Works, City of Tracy. Dated September 13, 2001 and docketed October 2, 2001.

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CEC (California Energy Commission) 2002aa. Report of Conversation between Rick Gilmore - BBID and Lorraine White. Dated June 28, 2002 and docketed August 2, 2002.

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CVRWQCB (Central Valley Regional Water Quality Control Board) 2001a. Letter Regarding the Completeness of Calpine's Report of Waste Discharge. Dated June 19, 2001 and docketed June 26, 2001.

CVRWQCB (Central Valley Regional Water Quality Control Board) 2002a. Report of Conversation between Patricia Leary – CVRWQCB and John Kessler – CEC, dated June 10, 2002.

DWR (California State Department of Water Resources) 2002a. Letter from DWR to BBID dated June 19, 2002 transmitting Draft Agreement Between DWR and BBID Regarding the Diversion of Water From the Delta. Docketed July 9, 2002.

DWR (California Department of Water Resources/Dan Flory) 2002b. Remaining issues associated with the agreement between DWR and BBID. Dated 7/9/02 and docketed 7/9/02.

DWR (California Department of Water Resources) 2002e, Draft SWP Delivery Reliability Report, dated August 20, 2002.

DWR (California State Department of Water Resources) 2001a. Comments on the East Altamont Energy Center AFC. Dated May 14, 2001 and docketed May 18, 2001.

DWR (California Department of Water Resources) 2002c, California Water Plan Update 1998.

DWR (California Department of Water Resources) 2002d, California Water Plan Update 2003.

EAEC (East Altamont Energy Center) 2001a. Application for Certification, Volume 1 & Appendices, East Altamont Energy Center (01-AFC-4). Dated March 20, 2001 and docketed March 29, 2001.

EAEC (East Altamont Energy Center) 2001e. Data Adequacy Response Set 1. Dated and docketed May 1, 2001.

EAEC (East Altamont Energy Center) 2001f. Data Adequacy Response Set 2. Dated and docketed May 3, 2001.

EAEC (East Altamont Energy Center) 2001g. Supplement A to the East Altamont Energy Center (01-AFC-4). Dated and docketed May 3, 2001.

EAEC (East Altamont Energy Center) 2001i. Data Adequacy Response Set 3. Dated and docketed May 7, 2001.

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SWRCB (State Water Resources Control Board) 1998, Exhibit A, Water Right Order 98-08, Declaration of Fully Appropriated Stream Systems, November 19, 1998.